ANDHRA MAHILA SABHA
Arts & Science College for Women
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O.U. Campus, Hyderabad.

DEPARTMENT OF ZOOLOGY
SCHEME OF INSTRUCTION AND EVALUATION 2025-2026

B.Sc (BZC& BtZC) I year I Semester

Subject & Code	Subject	Hours / Week		Exam Duration	Marks			No Of Credits
		Theory	Practical		Sem	Internal	Total	
English Eng 101	General English	5Hrs		3 Hrs	80	20	100	5
Telugu / Hindi/Sanskrit Tel/Hin/San101	Telugu Hindi/ Sanskrit	5Hrs		3 Hrs	80	20	100	5
Botany Bot/Bio101	DSC 1 A	4 Hrs		3 Hrs	80	20	100	4
Zoology Zoo101	DSC 2A	4 Hrs		3 Hrs	80	20	100	4
Chemistry Che101	DSC 3A	4 Hrs		3 Hrs	80	20	100	4
Practicals								
Botany Bot/Bio131	DSC 1 A (Pra)	-	2 Hrs	3 Hrs	30	20	50	1
Zoology Zoo 131	DSC 2A (Pra)	-	2 Hrs	3 Hrs	30	20	50	1
Chemistry Che131	DSC 3A (Pra)	-	2 Hrs	3 Hrs	30	20	50	1
							Total:	25

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DEPARTMENT OF ZOOLOGY
SCHEME OF INSTRUCTION AND EVALUATION 2025-2026
B.Sc (BZC&BtZC) I year II Semester

Subject & Code	Subject	Hours / Week		Exam Duration	Marks			No Of Credits
		Theory	Practical		Sem	Internal	Total	
English Eng 151	General English	5Hrs		3	80	20	100	5
Telugu /Hindi Sanskrit Tel/Hin/San151	Telugu/Hindi/ Sanskrit	5Hrs		3	80	20	100	5
Botany Bot/Bio151	DSC 1B	4 Hrs		3	80	20	100	4
Zoology Zoo151	DSC 2B	4 Hrs		3	80	20	100	4
Chemistry Che151	DSC 3B	4 Hrs		3	80	20	100	4
Practicals								
Botany Bot/Bio181	DSC 1B(Pra)		2 Hrs	3 Hrs	30	20	50	1
Zoology Zoo 181	DSC 2B(Pra)		2 Hrs	3 Hrs	30	20	50	1
Chemistry Che181	DSC 3B (Pra)		2 Hrs	3 Hrs	30	20	50	1
							Total :	25

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B. Sc (BZC & BtZC) I Year
Semester- I
Discipline Specific Course
Paper – I

ANIMAL DIVERSITY – INVERTEBRATES & VERTEBRATES

Theory Syllabus

Sub code: ZOO 101

Instruction:	60 Hrs (4 hrs./ week)
Duration of End Semester Examination:	3Hrs(80 M)
Duration of Sessional Examination:	1hr (20M)
Semester Examination:	(80 M)
Sessional Examination:	(20 M)

UNIT I: INVERTEBRATES - PROTOZOA TO NEMATHELMINTHES
(15 Periods)

1.1 Concepts of: Multicellularity; Diploblastic and triploblastic organization; Symmetries; Body cavities.
1.2 Protozoa: General characteristics and classification up to classes; Locomotory organelles and locomotion in Protozoa.
1.3 Porifera: General characteristics and classification up to classes; Canal system in sponges and spicules; Evolutionary significance of sponges as early metazoans.
1.4 Cnidaria: General characteristics and classification up to classes; Polymorphism in Hydrozoa and Siphonophora; Coral reef formation and ecological significance.
1.5 Helminthes: General characteristics and classification up to classes of Platyhelminthes and Nemathelminths; Parasitic adaptations in helminths; Regeneration in Turbellarians.

UNIT II: INVERTEBRATES – ANNELIDA TO HEMICHORDATA (15 Periods)

2.1 Annelida: General characteristics and classification up to classes; Metamerism and its evolutionary significance; Coelom and coelomocytes.
2.2 Arthropoda: General characteristics and classification up to classes; Vision in arthropods and metamorphosis in insects; Economic importance of insects.
2.3 Mollusca: General characteristics and classification up to classes; Torsion and detorsion in gastropods; Pearl formation and economic importance of molluscs.
2.4 Echinodermata: General characteristics and classification up to classes; Water vascular system in starfish; Larval forms of echinoderms.
2.5 Hemichordata: General characteristics and affinities of Hemichordata.

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UNIT III: VERTEBRATES - PROTOCHORDATES TO AMPHIBIANS (15 Periods)

3.1 General characteristics of Urochordata and Cephalochordata; Retrogressive metamorphosis in Urochordata.

3.2 Cyclostomata: General characteristics and classification; Evolutionary status and affinities of cyclostomes.

3.3 Pisces: General characteristics and classification up to classes and major orders; Migration and osmoregulation in migratory fishes; Parental care in fishes.

3.4 Amphibia: General characteristics and classification up to orders; Parental care, neoteny, and paedogenesis in amphibians.

3.5 Evolutionary Trends in Early Vertebrates: Transition from water to land; Adaptive features in early tetrapod.

UNIT IV: VERTEBRATES - REPTILIA TO MAMMALIA (15 Periods)

4.1 Reptilia: General characteristics and classification up to orders; Biting mechanism in snakes and temporal fossae in reptiles; Adaptive radiations in Mesozoic reptiles.

4.2 Aves: General characteristics and classification up to orders; Flight adaptations and migration in birds; Evolutionary significance of birds as theropod ancestors.

4.3 Mammalia: General characteristics and classification up to orders; Origin of mammals: Monotremes, marsupials, and placentals; Dentition and aquatic adaptations in mammals.

4.4 Evolutionary Trends in Vertebrates: Origin of amniotes and evolutionary significance of amniotic egg; Primate evolution and human ancestry.

4.5 Conservation of Vertebrate Diversity: Threats to vertebrate diversity; Conservation strategies for endangered species.

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Suggested Readings:

1. Ruppert, E.E., Fox, R.S., Barnes, R.D. (2004). Invertebrate Zoology: A Functional Evolutionary Approach. VII Edition, Cengage Learning, India
2. Barrington, E.J.W. (2012). Invertebrate Structure and Functions, II Edition, ELBS and Nelson.
3. Pechenik, J. A. (2015). Biology of the Invertebrates. VII Edition, McGraw-Hill Education
4. Hickman, C., Keen, S., Larson, A., Eisenhour, D. (2018). Animal Diversity, 9th Edition, McGraw Hill.
5. Young, J.Z. (2004). The Life of Vertebrates, III Edition, Oxford University Press.
6. Kardong, K.V. (2009). Vertebrates: Comparative Anatomy, Function, Evolution, 4th Edition, McGraw-Hill.
7. Pough F.H., Janis, C.M., Heiser, J.B., Heiser, C.B. (2009). Vertebrate Life, VIII Edition, Benjamin Cummings.
8. L.H. Hyman 'The Invertebrates' Vol I, II and V. – M.C. Graw Hill Company Ltd
9. Kotpal, R.L. Protozoa, Porifera, Coelenterata, Helminthes, Arthropoda, Mollusca, Echinodermata. Rastogi Publications, Meerut.
10. E.L. Jordan and P.S. Verma 'Invertebrate Zoology' S. Chand and Company.
11. R.D. Barnes 'Invertebrate Zoology' by: W.B. Saunders CO., 1986.
12. P.S. Dhami and J.K. Dhami. Invertebrate Zoology. S. Chand and Co. New Delhi.
13. Parker, T.J. and Haswell 'A text book of Zoology' by, W.A., Mac Millan Co. London.
14. Mohan P.Arora. 'Chordata – I, Himalaya Publishing House Pvt.Ltd.
15. Marshal, Parker and Haswell 'Text book of Vertebrates'. ELBS and McMillan, England.
16. J.W. Young, The Life of Vertebrates, 3rd ed, Oxford University press.
17. Harvey Pough F, Christine M. Janis, B. Heiser, Vertebrate Life, Pearson, 6th ed, Pearson Education Inc.2002.

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B.Sc(BZC& BtZC) I Year
Semester- I
Paper- I

ANIMAL DIVERSITY – INVERTEBRATES & VERTEBRATES

Practical Syllabus

Sub code: ZOO 131 **(Max.Marks : 50M)**
Time : 3 Hrs

1. Study of Museum Specimens/Slides/Models (with Classification of animals)
1. Protozoa: *Amoeba, Paramecium, Plasmodium vivax*
2. Porifera: *Sycon, Spongilla*
3. Cnidaria: *Obelia, Aurelia*
4. Platyhelminthes: *Fasciola, Taeniasolium*
5. Nemathelminths: *Ascaris, Wuchereria*
6. Annelida: Nereis, *Hirudinaria*
7. Arthropoda: Prawn, *Periplaneta*
8. Mollusca: *Pila, Sepia*
9. Echinodermata: *Asterias, Echinus*
10. Protochordates: *Balanoglossus, Amphioxus*
11. Cyclostomata: *Petromyzon, Myxine*
12. Pisces: *Scoliodon, Labeo*
13. Amphibia: *Hoplobatrachus, Bufo*
14. Reptilia: *Calotes, Naja*
15. Aves: *Columba, Passer*
16. Mammalia: *Pteropus, Oryctolagus, Funambulus*

2. Dissections Prawn: Appendages, digestive system, nervous system, mounting of statocyst. Insect: Mouthparts of Anopheles, Culex, housefly, and butterfly. Virtual dissection of Labeo/Tilapia: Digestive system, brain, and cranial nerves (demonstration only).
3. Key for identification of venomous and non-venomous snakes
4. First aid for snake bite mitigation
5. Animal Album: Mandatory submission of an "Animal album" containing photographs, cut-outs, and write-ups about the studied taxa.
6. Visit to Zoological Park or Natural History Museum
7. Computer-Aided Techniques : Use of virtual dissections and animations for better understanding of anatomical structures.

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Suggested manuals:

1. Lal, S.S. Practical Zoology – Invertebrates, Rastogi Publications.
2. Verma, P.S. Practical Zoology – Invertebrates, S. Chand Publications.
3. Verma, P.S. A Manual of Practical Zoology – Chordata, S. Chand Publications.
4. S.S.Lal, Practical Zoology – Vertebrata
5. Freeman & Bracegirdle, An atlas of embryology.

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B.Sc(BZC& BtZC) I Year
Semester- II
Discipline Specific Course
Paper – II

COMPARATIVE ANATOMY OF VERTEBRATES AND DEVELOPMENTAL BIOLOGY

Theory Syllabus

Sub code:ZOO 151	
Instruction:	**60 Hrs (4 hrs./ week)**
Duration of End Semester Examination:	**3Hrs (80 M)**
Duration of Sessional Examination:	**1hr (20M)**
Semester Examination:	**(80 M)**
Sessional Examination:	**(20M)**

UNIT – I: Integumentary, Skeletal, and Muscular Systems (15 Periods)

1.1 Comparative study of structure and function of integument and its derivatives (glands, scales, feathers, and hair) from fishes to mammals.
1.2 Comparative study of axial skeleton in fishes to mammals (skull and vertebrae).
1.3 Comparative study of appendicular skeleton in fishes to mammals (pectoral and pelvic girdles; limbs).
1.4 Comparative anatomy of axial, appendicular, branchiomeric, and integumentary muscles.
1.5 Comparative study of adaptive modifications in vertebrate locomotion (swimming, walking, and flying).

UNIT – II: Digestive, Respiratory, Circulatory, and Excretory Systems (15 Periods)

2.1 Evolution of the Digestive System – Structural and functional modifications of the alimentary canal and digestive glands from fishes to mammals.
2.2 Respiratory System Adaptations – Comparative study of respiratory structures (gills, swim bladders, lungs, and air sacs) and their evolutionary significance.
2.3 Circulatory System Variations – Morphological and functional diversity of the heart, aortic arches, and major blood vessels in vertebrates.
2.4 Excretory System and Osmoregulation – Evolution of kidneys, urinary bladders, and their ducts in different vertebrate groups with adaptations to aquatic and terrestrial environments.
2.5 Nephron and Kidney Evolution – Comparative anatomy of nephron structure, types of kidneys (pronephros, mesonephros, metanephros), and their evolutionary succession.

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UNIT – III: Reproductive, Nervous, and Sensory Systems **(15 Periods)**

3.1 Evolution of Reproductive Organs – Structural and functional modifications in male and female reproductive organs from fishes to mammals.
3.2 Modifications in Vertebrate Genital Structures – Evolutionary adaptations in gonads, accessory reproductive structures, and reproductive strategies across vertebrates.
3.3 Comparative Anatomy of the Nervous System – Structural variations in the vertebrate brain and cranial nerves from fishes to mammals.
3.4 Spinal Cord and Peripheral Nervous System – Comparative study of the spinal cord and spinal nerves, their structural and functional modifications in vertebrates.
3.5 Sensory Organs and Receptor Systems – Comparative study of sensory organs (vision, hearing, taste, smell, and touch) and sensory receptors (special somatic and special visceral receptors)from fishes to mammals.

UNIT – IV: Developmental Biology **(15 Periods)**

4.1 Early Embryonic Development: Gametogenesis (spermatogenesis and oogenesis) in mammals; vitellogenesis in birds; Fertilization mechanisms, and blocks to polyspermy.
4.2 Cleavage and Gastrulation: Structure of the fertilized chick egg; Patterns of cleavage, presumptive areas, fate maps.
4.3 Late Embryonic Development: Implantation of the rabbit embryo; Extraembryonic membranes; Placenta and types.
4.4 Organogenesis: Morphogenetic movements; Neurulation and notogenesis in frogs.
4.5 Basic principles of Evolutionary Developmental Biology Hox genes, and their role in vertebrate development and evolution.

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SUGGESTED READINGS:

1. E.L.Jordan and P.S. Verma 'Chordate Zoology' -. S. Chand Publications.
2. Mohan P. Arora. 'Chordata – I, Himalaya Publishing House Pvt.Ltd.
3. Marshal, Parker and Haswell 'Text Book of Vertebrates'. ELBS and McMillan, England.
4. Alfred Sherwood Romer. Thomas S. Pearson 'The Vertebrate Body, Sixth edition, CBS College Publishing, Saunders College Publishing
5. George C. Kent, Robert K. Carr. Comparative Anatomy of the Vertebrates, 9th ed. McGraw Hill.
6. Kenneth Kardong Vertebrates: Comparative Anatomy, Function and Evolution, 4th ed, McGraw Hill.
7. J.W. Young, The Life of Vertebrates, 3rd ed, Oxford University Press.
8. Harvey Pough F, Christine M. Janis, B. Heiser, Vertebrate Life, Pearson, 6th ed, Pearson
9. Education Inc.2002.
10. Gilbert, S. F. (2010). Developmental Biology, IX Edition, Sinauer Associates, Inc.,
11. Publishers, Sunderland, Massachusetts, USA.
12. Balinsky B. I. and Fabian B. C. (1981). An Introduction to Embryology, V Edition, International Thompson Computer Press.
13. Carlson, R. F: Patten's Foundations of Embryology
14. Kalthoff (2008). Analysis of Biological Development, II Edition, McGraw-Hill Publishers.
15. Berril. N.J. and Karp: Developmental Biology. McGraw Hill, New York.

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Discipline Specific Course
Paper – II

COMPARATIVE ANATOMY OF VERTEBRATES AND DEVELOPMENTAL BIOLOGY

Practical Syllabus

Sub code :Zoo 181
Time : 3 hrs **(Max.Marks : 50M)**

1. Comparative Study of Vertebrate Skeletons: Observation and identification of skeletal structures from different vertebrate groups (fishes, amphibians, reptiles, birds, mammals).
2. Histological Examination of Tissues: Microscopic study of integumentary, muscular, and glandular tissues in different vertebrates.
3. Virtual Dissection and Organ System Comparison: Dissection of representative vertebrates to study the digestive, respiratory, circulatory, nervous and urogenital systems.
4. Comparison of the anatomy of locomotory appendages in different groups of vertebrates .
5. Developmental Biology Experiments: Study of frog/chick embryology through prepared slides, observation of cleavage, gastrulation, and neurulation stages.

Suggested Manuals

1. Freeman & Bracegirdle, An atlas of embryology
2. George C. Kent, Robert K. Carr. Comparative Anatomy of the Vertebrates, 9th ed. McGraw Hill.
3. Kenneth Kardong Vertebrates: Comparative Anatomy, Function and Evolution, 4th ed, McGraw Hill.

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