

B. Sc. ZOOLOGY - I YEAR - SEMESTER – II
KAKATIYA UNIVERSITY – WARANGAL - TELANGANA
Under Graduate Courses (Under CBCS 2025-26 onwards)
**PAPER-II: COMPARATIVE ANATOMY OF VERTEBRATES AND
DEVELOPMENTAL BIOLOGY**

UNIT – I: Integumentary, Skeletal, and Muscular Systems

- 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, branchiomic, 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

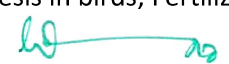
- 2.1 Evolution of the Digestive System – Structural and functional modifications of the alimentary canal and digestive glands from fishes to mammals.
- 2.2 Respiratory System Adaptations – Comparative study of respiratory structures (gills, swim bladders, lungs, and air sacs) and their evolutionary 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.

UNIT – III: Reproductive, Nervous, and Sensory Systems

- 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

- 4.1 Early Embryonic Development: Gametogenesis (spermatogenesis and oogenesis) in mammals; vitellogenesis in birds; Fertilization mechanisms, and blocks to polyspermy.


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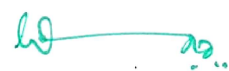

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- 4.2 Cleavage and Gastrulation: Structure of the fertilized chick egg; Patterns of cleavage, presumptive areas, fate maps.
- 4.3 Late Embryonic Development: Implantation of the rabbit embryo; Extraembryonic membranes; Placenta and types.
- 4.4 Organogenesis: 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.

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., 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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