

DISCIPLINE SPECIFIC ELECTIVE COURSE

BZO: E501 COMPARATIVE ANATOMY AND DEVELOPMENTAL BIOLOGY OF VERTEBRATES

(Credits: Theory-4, Practical-2)

SEMESTER – V

Lectures: 60

Unit 1

Integumentary System: Derivatives of integument w.r.t. glands and digital tips; Skeletal System: Evolution of visceral arches; Digestive System: Brief account of alimentary canal and digestive glands; Respiratory System: Gills, lungs, air sacs and swim bladder.

Unit 2

Circulatory System: Evolution of heart and aortic arch; Urinogenital System: Succession of kidney, Evolution of urinogenital ducts.

Unit 3

Nervous System: Comparative account of brain; Sense Organs: Types of receptors

Unit 4

Early embryonic development: Gametogenesis: Spermatogenesis and oogenesis w.r.t mammals, vitellogenesis in birds; Fertilization: external (amphibians), internal (mammals), blocks to polyspermy; Early development of frog and humans (structure of mature egg and its membranes, patterns of cleavage, fate map, up to formation of gastrula); types of morphogenetic movements; Fate of germ layers; Neurulation in frog embryo.

Unit 5

Late embryonic development: Implantation of embryo in humans, Formation of human placenta and functions, other types of placenta on the basis of histology; Metamorphic events in frog life cycle and its hormonal regulation.; Control of Development: Fundamental processes in development (brief idea) – Gene activation, determination, induction, Differentiation, morphogenesis, intercellular communication, cell movements and cell death.

SUGGESTED READINGS: A. COMPARATIVE ANATOMY

- Kardong, K.V. (2005) *Vertebrates' Comparative Anatomy, Function and Evolution*. IV Edition. McGraw-Hill Higher Education.
- Kent, G.C. and Carr R.K. (2000). *Comparative Anatomy of the Vertebrates*. IX Edition. The McGraw-Hill Companies.
- Weichert C.K and William Presch (1970). *Elements of Chordate Anatomy*, TataMcGraw Hills
- Hilderbrand, M and Gaslow G.E. *Analysis of Vertebrate Structure*, John Wiley and Sons.
- Walter, H.E. and Sayles, L.P; *Biology of Vertebrates*, Khosla Publishing House.

B. DEVELOPMENTAL BIOLOGY

SUGGESTED READINGS

- Gilbert, S. F. (2006). *Developmental Biology*, VIII Edition, Sinauer Associates, Inc., Publishers, Sunderland, Massachusetts, USA.
 - Balinsky, B.I. (2008). *An introduction to Embryology*, International Thomson Computer Press.
 - Carlson, Bruce M (1996). *Patten's Foundations of Embryology*, McGraw Hill, Inc.
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