SEMESTER-II

Core Course: Zoology: DSC-02

BZO-C 201: COMPARATIVE ANATOMY AND DEVELOPMENTAL BIOLOGY OF VERTEBRATES

(Credits: Theory-4, Practicals-4)

THEORY

Lectures: 60 **M.M.: 70**

UNIT-I

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. *(12 Lectures)*

UNIT-II

Circulatory System: Evolution of heart and aortic arch; **Urinogenital System:** Succession of kidney, Evolution of urinogenital ducts. *(10 Lectures)*

UNIT-III

Nervous System: Comparative account of brain; **Sense Organs:** Types of receptors *(10 Lectures)*

UNIT-IV

Early embryonic development: Gametogenesis: Spermatogenesis and oogenesis in 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. *(14 Lectures)*

UNIT-V

Late embryonic development: Implantation of embryo in humans, Formation of human placenta and functions, other types of placentae 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 *(14 Lectures)*

Note: The question paper shall consist of two sections (A & B). Section A shall contain ten short answer type questions of six marks each and student has to attempt any five questions in about 150 words each. Section B shall consist eight long answer type questions of ten marks each and student shall be required to attempt any four questions in detail. Questions shall be uniformly distributed from the entire syllabus. The previous year paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

SUGGESTED READINGS: COMPARATIVE ANATOMY

1. Kardong, K.V. (2005) *Vertebrates' Comparative Anatomy, Function and Evolution*. IV Edition. McGraw-Hill Higher Education.

2. Kent, G.C. and Carr R.K. (2000). *Comparative Anatomy of the Vertebrates*. IX Edition. The McGraw-Hill Companies.

3. Weichert C.K and William Presch (1970). *Elements of Chordate Anatomy*, Tata McGraw Hills

4. Hilderbrand, M and Gaslow G.E. *Analysis of Vertebrate Structure*, John Wiley and Sons.

5. Walter, H.E. and Sayles, L.P; *Biology of Vertebrates*, Khosla Publishing House.

B. DEVELOPMENTAL BIOLOGY

SUGGESTED READINGS

1. Gilbert, S. F. (2006). Developmental Biology, VIII Edition, Sinauer Associates, Inc., Publishers, Sunderland, Massachusetts, USA.

2. Balinsky, B.I. (2008). An introduction to Embryology, International Thomson Computer Press.

3. Carlson, Bruce M (1996). Patten's Foundations of Embryology, McGraw Hill, Inc.

BZO-C 251: PRACTICAL

M.M.:70

A. COMPARATIVE ANATOMY

1. Osteology:

a. Disarticulated skeleton of fowl and rabbit

b. Carapace and plastron of turtle /tortoise

c. Mammalian skulls: One herbivorous and one carnivorous animal.

B. DEVELOPMENTAL BIOLOGY

1.Frog - Study of developmental stages - whole mounts and sections through permanent slides – cleavage stages, blastula, gastrula, neurula, tail bud stage, tadpole-external and internal gill stages.

2. Study of the different types of placentae- histological sections through permanent slides or photomicrographs.

3. Study of placental development in humans by ultrasound scans.

4. Examination of gametes - frog/rat - sperm and ova through permanent slides or photomicrographs.