Paper- I: Comparative Anatomy of Vertebrates
ZOO301

Unit-1
1. Origin of Chordata: Concept of Protochordata
2. Development, structure and functions of integument and its derivatives (glands, scales, feathers and hairs)
3. Respiratory system : Characters of respiratory tissue, external and internal respiration. Comparative account of respiratory organs.
4. Comparative account of Digestive System.

Unit-2
1. Evolution of heart.
2. Evolution of aortic arches and portal systems.
3. Blood circulation in various vertebrates groups.
4. Comparative account of jaw suspensorium and vertebral column.

Unit-3
1. Evolution of urinogenital system in vertebrates.
2. Comparative account of organs of olfactory and taste.
3. Comparative anatomy of brain and spinal cord (CNS).
4. Comparative account of peripheral and autonomous nervous system.

Unit-4
1. Comparative account of lateral line system.
2. Comparative account of electroreception.
3. Flight adaptations in vertebrates.
4. Aquatic adaptations in birds and mammals.

Unit-5
1. Origin, evolution general organization and affinities of Ostracoderms .
2. General organization, specialized, generalized and degenerated characters of Cyclostomes.
4. General account of Elasmobranchi, Holocephali, Dipnoi and Crossoptergii.

Suggested Reading Materials:
1. Carter, G.S. Structure and habit in vertebrate evolution – Sedgwick and Jackson, London.
2. Kingsley, J.S. Outlines of Comparative Autonomy of Vertebrates, Central Book Depot. Allahabad,
3. Kent, C.G. Comparative anatomy of vertebrates
4. Malcom Jollie, Chordata morphology. East – West Pres Pvt. Ltd., New Delhi.
6. Smith, H.S. Evolution of Chordata structure. Hold Rinchart and Winstoin Inc. New York.
7. Sedgwick, A.A. Students Text Book of Zoology, Vol.II

MSc Zoology III semester
Paper- II: Developmental Biology
ZOO302

Unit -I:

1. Basic concept of development: cell division and cell cycle, chromosomal puffs and gene activation, cell commitment and differentiation
2. Morphogen gradients, cell fate, cell potency and morphogenesis.
3. Gametogenesis: origin and migration of primordial germ cell; production of male gametes (spermatogenesis), gene expression during spermatogenesis and sperm maturation.
4. Production of female gametes (oogenesis) gene expression during amphibian oogenesis, ovulation and ovum transport in mammala.

Unit-II:

1. Fertilization and early development: pre fertilization events, biochemistry of fertilization, post fertilization events.
2. Establishment of polarity in amphibians and birds.
3. Gastrulation and formation of germ layer in mammals
4. Multiple ovulation and embryo transfer technology: in vitro oocyte maturation and super ovulation.

Unit-III:

1. Hormonal regulation of development of mammary glands and lactation
2. Hormonal regulation of ovulation, pregnancy and parturition
3. Endocrinology and physiology of placenta
4. Collection and cryopreservation of gametes and embryos

Unit- IV:

1. Teratological effects of xenobiotics on gametes
2. Wolfian lens regeneration
3. Melanogenesis
4. Differentiation and development of gonads

Unit-V:

1. Cell diversification in early embryos, xenopus blastomeres, totipotency & pleuripotency
2. Embryonic stem cells, chord-blood cells & their significance
3. Hematopoietic stem cells, formation of blood cells
4. Connective tissue cell family

Suggested Reading Materials:

1. VK Agrawal, Chordate embryology
2. Scott F. Gilbert, Developmental Biology 9th Edition

Paper- III: ECO- TOXICOLOGY
ZOO303

Unit-1
1. General principles of Environmental Biology with emphasis on ecosystems.
2. Abiotic and biotic factors of ecosystems.
3. Communities of the environment, their structure & significance.
4. Energy flow in environment: Ecological energetic.

Unit-2
1. Productivity, Production and analysis.
2. Recycling and reuse technologies for solid and liquid wastes and their role in environmental conservation.
3. Remote sensing –basic concepts and applications of remote sensing techniques in environmental conservation.
4. Environmental indicators and their role in environmental balance.

Unit-3
1. Kinds of environmental pollution and their control methods.
2. Radioactive compounds and their impact on the environment.
3. Vehicular exhaust pollution causes and remedies.
4. Noise pollution.

Unit-4
1. Toxicology- Basic concepts, Principles and various types of toxicological agents.
2. Toxicity testing principles, hazards, risks and their control methods.
3. Food toxicants and their control methods.
4. Public Health Hazards due to environmental disasters.

Unit-5
1. Pesticides, types, nature and their effects on environment.
2. Important heavy metals and their role in environment.
3. Agrochemical use and misuse, alternatives.
4. Occupational Health Hazards and their Control.

Suggested Reading Materials:
1. Clark : Elements of ecology
2. Odum : Fundamentals of Ecology
3. South Woods : Ecological methods
4. Trivedi and Goel : Chemical and biological methods for water pollution studies

Paper- IV: ENDOCRINOLOGY
ZOO304

Unit-I:
1. History and scope of endocrinology
2. Endocrine methodologies
3. Mechanism of hormone action
4. Hormones and environment

Unit-II:
1. General and comparative structure of anterior pituitary gland
2. General and comparative structure of neurohypophysis
3. General and comparative structure of thyroid gland
4. General and comparative structure of parathyroid gland

Unit-III:
1. General and comparative structure of pancreas
2. Structure of mammalian pineal body
3. General and comparative structure of adrenal medulla
4. General and comparative structure of adrenal cortex

Unit-IV:
1. Neurosecretion and neuroendocrine mechanism in invertebrates
2. Neuroendocrine system in crustacea
3. Neuroendocrine system in insecta
4. Neuroendocrine system in mollusca

Unit-V:
1. Caudal neurosecretary system in fish
2. General structure of thymus
3. Endocrine integration: migration of birds and fishes
4. Hormones like substances: ectohormones and phytohormones

Suggested Reading Materials:

1. EJW Barrington-General & comparative Endoctrinology-Oxford, Claredon Press
2. R.H. Williams-Text Book of Endocrinology-W.B. Saunders
3. C.R. Martin- Endocrine Physiology-Oxford University Press.
4. Molecular Cell Biology-J. Darnell, H. Lodish and D. Baltimore-Scientific American Book USA
5. Molecular Biology of the cell-B. Alberts, D-Bray, J.Lewis, M. Raff, K. Roberts and J.D. Watson, Garland Pub. New York.