PSO's of B.Sc. Zoology

PSO 1 : Analyse the general characters, classification and evolutionary significance of non-chordates (Protista to pseudocoelomates).

PSO 2 : Understand the basic concepts of ecology, its components and biostatistics.

PSO 3 : Analysis the general characters, classification and evolutionary significance of coelomate non chordates.

PSO 4 : Understand the structural organization, histology, functions and mechanism of the life sustaining systems.

PSO 5 : Understand the origin, distribution, classification, characters and special features of all chordates starting from most primitive forms (protochordates) to the most advanced forms (mammals).

PSO 6 : understand the structure, histology and functioning of the controlling and co-ordinating systems.

PSO 7: Analyse the relationship between different vertebrate groups with respect to the anatomy of different systems.

PSO 8: Understand the biochemistry and various metabolic processes associated with organic compounds.

PSO 9 : Understand the structure and functions of various cellular organelles.

PSO 10 : Understand the concepts of Mendelian genetics, chromosomal mapping, mutations controlling our systems, mechanism of sex determination, extra chromosomal inheritance.

PSO 11 : Understand the different aspects of animal development at different embryonic stages and application of these concepts in modern fields of research biology.

PSO 12: Understand the structure of DNA, DNA replication, transcription, translation and regulatory factors controlling the above processes.

PSO 13 : Understand the basic concepts of human defense mechanism, the cells/organs and their secretions involved in the different immunological responses and the application of these concepts in modern biotechnology.

PSO 14 : Analyse the evolution of different forms of life and the forces controlling them.

Course outcomes

Core-1

Diversity and Evolution of Non-chordata (Protista to Pseudocoelomates).

CO 1 : Discuss about the general characteristics, classification upto classes, locomotion and reproduction in Protista. Give an account of life cycle, pathogenicity and prophylaxis of *Plasmodium vivax*, *Trypanosoma gambiens* and *Entamoeba histolytica.*

CO 2 : Describe the general characters and classification upto classes of phylum porifera and ctenophore. Give an account of canal system in sponges. Discuss about the general characters and evolutionary significance of parazoa and metazoa.

CO 3 : Discuss about the general characteristics and classification upto classes of phylum cnidarian, corals and coral reefs.

CO 4 : Give an account of the general characteristics and classification upto classes of phylum Platyhelminthes. Describe the life cycle, pathogenicity and prophylaxis along with parasitic adaptation of *Fasciola hepatica* and *Taeniasolium*.

CO 5 : Describe the general characteristics and classification upto classes of phylum nemathelminthes. Discuss about the life cycle, pathogenicity, prophylaxis and parasitic adaptation of *Ascarislumbricoides* and *Wuschereriabancrofti*.

Core-2

Perspective in Ecology and Biostatistics.

CO 1 : Write the relevance of studying ecology. Briefly describe the history of ecology. Discuss the laws of limiting factors. Describe light and temperature as ecological factors along with their effects. Write notes on food chain, food web, energy flow through the ecosystem and ecological pyramids.

CO 2 : Describe the characteristics of population. Give an account of different patterns of population growth. Discuss about population regulation and population interactions. Discuss Gause' Principle. Write a note on Lotka-Volterra equation for competition and predation.

CO 3 : Discuss the different characteristics of community. Write notes on ecotone and edge effect. Discuss ecosystem development (succession) with examples. Give an account of the theories pertaining to climax community. Write notes on nutrient and biogeochemical cycles.

CO 4 : Give an account of the different types of biodiversity and their significance. Discuss about causes of loss of biodiversity. Describe in detail about the different types of conservation strategies. Write note on endangered species concept. Discuss the role of ZSI, WWF, IUCN, Wildlife (protection) Act. 1972.

CO 5 : What is biostatistics. Discuss its concept and scopes. Discuss the measures of central tendency. Describe the measures of dispersion with relation to standard deviation. Write notes on Chi-square test, T test and Z test. Explain the analysis of correlation and regression. Write on data analysis using EXCEL programme.

Core-3

Diversity and Evolution of Non chordates (Coelomate Non chordates)

CO 1 : Describe the general characteristics and classification upto classes of phylum Annelida. Write notes on coelom, metamerism and excretion in Annelidas.

CO 2 : Write down the general characteristics and classification upto the classes of phylum Arthropoda. Discuss about vision and respiration in Arthropodas. Write notes on moulting, metamorphosis and social life in insects. Give an account of larval forms of crustacea.

CO 3 : Describe the general characteristics and evolutionary significance including affinities of peripatus.

CO 4 : Give an account of general characters and classification upto classes of phylum Mollusca. Describe respiration, torton and detorton in Mollusca. Write notes on pearl formation in bivalves and evolutionary significance of trochophore larva.

CO 5 :Discuss about the general characteristics and classification upto classes of phylum Echinodermata. Write notes on larval forms and evolutionary significance of Echinodermata. Give an account of water vascular system in Asteroids i.e. starfish.

Core-4

Physiology- life Sustaining Systems.

CO 1 : Describe the structural organization, histology and functions of alimentary canal and its associated glands. Discuss about the physiology of digestion and absorption of food.

CO 2 : Write down the histology of the respiratory organs and the mechanisms of respiration.

CO 3 : Discuss about the structure of the kidney and the mechanism of urine formation and its regulation.

CO 4 : Describe the composition and functions of blood. Write a note on the mechanism of blood coagulation and blood related disorders.

CO 5 : Discuss about the structure of the heart, coronary circulation, conduction of cardiac impulse, cardiac cycle. Write a note on nervous and chemical regulation of heart beat.

Core-5

Diversity and Distribution of Chordata.

CO 1 : Discuss about the different theories related to origin of phylum Chordata. Describe the different characteristics of the three different classes of subphylum Protochordata. Write notes on the larval forms of protochordates and retrogressive metamorphosis in Urochordata.

CO 2 : Give an account of the advanced features of vertebrates over protochordates. Identify the general characteristics and classification of Cyclostomes upto class. Write notes on the structural peculiarities and affinities of *Petromyzon* and *Myxine.*

CO 3 : Describe the general characteristics and classification of chondrichthyes, osteichthyes and Amphibia upto orders. Write notes on the types of parental care in fishes and amphibians. Discuss on migration, osmoregulation and scales of fishes. Write a note on origin of tetrapoda.

CO 4 : Identify the general characteristics and classification of clasessReptilia and Aves upto orders. Write a note on skull in Reptiles, affinities of *Sphenodon*, poison apparatus and biting mechanism in snakes. Give an account of principles and aerodynamics of flight, flight adaptations and migration in birds. Write a note on *Archaeopteryx* as a connecting link.

CO 5 : Discuss the general characteristics and classification of mammals upto orders. Write notes on affinities of Prototheria and Metatheria, dentition in mammals. Discuss about the adaptive radiation in mammals with reference to locomotory appendages. Givean account of the zoological realms and theories pertaining to the distribution of animals in different realms.

Core-6

Physiology- Controlling and Coordinating Systems.

CO 1 : Study the structure, location, functions and types of different tissues.

CO 2 : Discuss about the structure of neuron, mechanism of transmission of nerve impulse. Write a reflex action and its mechanism. Describe the physiology of hearing and vision.

CO 3 : Describe the histology of different types of muscles, mechanism of muscle contraction and characteristics of muscle.

CO 4 : Discuss about the histology and physiology of male and female reproductive systems. Write a note on methods of contraception.

CO 5 : Describe the histology of different endocrine glands, the hormones secreted by them, their functions and disorders.

Core-7

Comparative Anatomy of Vertebrates.

CO 1 : Describe the structure, functions and derivatives of integumentary system. Give a comparative account of the axial and appendicular skeleton in different vertebrates. Give an account of jaw suspensorium in vertebrates.

CO 2 : Give a comparative account of alimentary canal and associated glands in different groups of vertebrates. Describe skin, gills, lungs and air sacs as respiratory organs in different vertebrates. Write a note on accessory respiratory organs in fishes.

CO 3 : Write a note on general plan of circulation in vertebrates. Give an account of the comparative anatomy of heart in different group of vertebrates. Add a note on its evolution. Discuss about the evolution of aortic arches in vertebrates.

CO 4 : Write a note on succession of kidney in vertebrates. Explain the evolution of urinogenital ducts in different vertebrates.

CO 5 : Give a comparative account of brain in different vertebrates. Write notes on autonomic nervous system, spinal cord, spinal nerves and cranial nerves in mammals. Classify the different types of receptors found in vertebrates.

Core-8

Biochemistry and Metabolic Processes.

Co 1 : Describe the structure and properties of carbohydrates, lipids and proteins.

Co 2 : Discuss about cellular respiration, Glycolysis, Krebs cycle, Pentos phosphate pathway, Gluconeogenesis, Glycogenolysis and Glycogenesis.

Co 3 : Write notes on β-oxidation of fatty acids.

Co 4 : Describe protein metabolism.

Co 5 : Describe about the kinetics and mechanism of enzyme action. Write a note on electron transport chain.

Core-9

Cell Biology.

CO 1 : Differentiate between prokaryotic and eukaryotic cells. Write notes on mycoplasma, virus, viroid, virisions and prions. Describe the various models of plasma membrane. Describe the mechanism of transportation across membrane. Give an account of the structure and functions of different types of cell junction.

CO 2 : Give an account of the structure, functions and semiautonomous nature of mitochondria. Describe the structure and functions of the endoplasmic reticulum. Describe about the structure and functions of the Golgi apparatus. Write down the structure and functions of the lysosomes. Write notes on mechanism of vesicular transport, chemiosmotic hypothesis, endosymbiotic hypothesis and peroxisomes.

CO 3 : Give an account of the structure and functions of different types of cytoskeleton . describe the ultrastructure and functions of nucleus. Discuss about the structure and functions of nucleolus. Write notes on nuclear envelope, structure of nuclear pore complex, chromosomal DNA and its packaging.

CO 4 : Describe cell cycle and its regulation. Discuss about signaling molecules and their receptors.

CO 5 : What is apoptosis. Discuss about its extrinsic and intrinsic pathways. Discuss about the growth and development of tumors and metastasis.

Core-10

Principles of Genetics.

CO 1 : Write the principles of inheritance including sex-linked inheritance. Discuss about incomplete dominance and co-dominance. Describe multiple alleles and lethal alleles. Give an account of epistasis and pleiotrophy.

CO 2 : Discuss the different types and mechanisms of linkage. Give an account of the types and molecular mechanisms of crossing over. Describe the different types of hybridization.

CO 3 : Describe the molecular basis of mutation and its types. Write down the different methods of detection of mutations. Give an account of the DNA repair mechanisms.

CO 4 : Write down the chromosomal methods of sex determination. Describe the sex-linked influenced and sex linked characters. Give an account of the roles of polygenic inheritance and transgressive variations in evolution.

CO 5 : Give an account of the criteria for extra chromosomal inheritance. Discuss the antibiotic resistance in *Chlamydomonous*. Describe mitochondrial mutations and maternal effects.

Core-11

Developmental Biology.

CO 1 : Discuss about the history and basic concepts of developmental biology. Give an account of the different types of cell-cell interaction, patterns of formation, differentiation and growth, gene expression, cytoplasmic determinants and asymmetric cell division.

CO 2 : Discuss the process of spermatogenesis and oogenesis. Give an account of the different types of egg and egg membranes. Describe the mechanism of fertilization, changes in the gametes involved in the process and incidence of monospermy and polyspermy. Discuss about the planes and patterns of the cleavage. Describe the early development of frog and chick upto gastrulation. Give an account of the different types of the fatemaps. Discuss the concept of embryonic induction. Describe the organizer concept.

CO 3 : Discuss about the fate of different embryonic germ layers. Give an account of the extra embryonic membranes in bird. Discuss about the implantation of embryo in human. Describe the structure, types and functions of placenta.

CO 4 : Give an account of the changes and hormonal regulation of metamorphosis in amphibians. Describe the different modes of regeneration. Discuss the concept and models of aging.

CO 5 : What is teratogenesis. Discuss its causative agents and their effects on embryonic development. Discuss about in vitro fertilization, stem cell culture and amniocentesis.

Core-12

Molecular Biology.

CO 1 : Describe the history and structure of DNA. Discuss the structure of RNA and its types. Give an account of the DNA replication in prokaryotes and eukaryotes and its types.

CO 2 : Describe the mechanism of transcription in eukaryotes and prokaryotes and factors regulating transcription. Give an account of the synthesis of rRNA and mRNA.

CO 3 : Give an account of the genetic code and Wobble hypothesis. Describe the process of protein synthesis in prokaryotes. Give an account of the structure of ribosome. Discuss the difference between prokaryotic and eukaryotic translation.

CO 4 : Describe the structure of globin mRNA. Discuss the splicing mechanism. Give an account of exon shuffling and RNA editing.

CO 5 : Give an account of transcription in eukaryotes and its regulation. Discuss gene silencing and genetic imprinting. Describe RNA interference miRNA and siRNA.

Core-13

Immunology.

CO 1 : Give an account of the histological perspective and early theories of immunology. Discuss the different types of immune responses and cells/organs associated with these responses. Discuss the different types of dysfunctions of immune system.

CO 2 : Discuss the different properties of immunogens and the factors influencing the immunogenicity. Write notes on adjuvents, haptens and epitopes.

CO 3 : Give an account of the structure and functions of different classes of immunoglobulins. Discuss the antigen-antibody interaction. Write notes on immunoassay, polyclonal sera, monoclonal antibodies and hybridoma technology.

CO 4 : Discuss the structure and functions of exogenous and endogenous pathways of antigen presentation. Discuss the components and pathways of complement activation.

CO 5 : Discuss the properties and functions of cytokines in addition to cytokine based therapies. Discuss the different types of hypersensitivities as per Gell and Coomb classification. Discuss the different types of vaccines in addition to DNA vaccines and recombinant vaccines.

Core-14

Evolutionary Biology.

CO 1 : Describe different theories on origin of life. Discuss the major events in history of life. Give an account of five major extinctions and their background. Adding a note on role of extinction in evolution.

CO 2 : Discuss about the different evidences of evolution with examples. Write a note on types of fossils and the process of dating of fossils based on molecular clock concept. Give an account of phylogeny of horse and human.

CO 3 : Write a note on the roles of different types and factors of natural selection in the process of evolutionary change. Give an account of the sexual selection and artificial selection contributing to the process of evolution. Discuss the roles of variations and isolations in evolution.

CO 4 : Give an account of gene frequencies and shifts in gene frequencies with and without selection. Write a note on Hardy-Weinberg equilibrium. Discuss gene pool, gene flow and genetic drift.

CO 5 : Describe different species concepts along with their advantages and limitations. Give an account of modes of speciation. Write a note on macro evolutionary principles of evolution in relation to Darwin's Finches. Explain convergence, divergence and parallelism.