

**Kalna College**  
**Department of Zoology**

**COURSE OUTCOMES**

**ZOOH - Non Chordates-I (CC-I)**

End of the course, students are able to understand:

**CO 01:** The evolutionary aspect of phylum and past scenario of animal, about the Non Chordate animals.

**CO 02:** Details of the external as well as internal characters of nonchordates..

**CO 03:** The economical importance of Poriferans and Cnidarians.

**CO 04:** Life cycle and pathogenicity of Platyhelminthes and Nematoda

**ZOOH - Non Chordates-I Practical (CC-I)**

End of the course, students are able to:

**CO 01:** Identify with significance of numerous protozoans, poriferans, cnidarians and helminthes as well as habitats and medical importances of these non chordate animals

**CO 02:** Prepare of Staining/mounting of any protozoa/helminth from gut of cockroach

**ZOOH - Ecology (CC-II)**

End of the course, students are able to understand:

**CO 01:** The history of ecology, detail of population structure, life table, strategies and population regulation, interactions

**CO 02:** The community characteristics, ecological succession with examples.

**CO 03:** The ecosystem with example in detail and energy flow through the ecosystem

**CO 04:** The nutrient and biogeochemical cycle with example of Nitrogen cycle, applied ecology and human modified ecosystem

**CO 05:** The Wildlife Conservation (in-situ and ex-situ conservation), Management strategies for tiger conservation and Wild life protection act (1972)

**ZOOH - Ecology practical (CC-II)**

End of the course, students are able to:

**CO 01:** Study of life tables and plotting of survivorship curves of different types from the hypothetical/real data provided

**CO 02:** Determine of population density in a natural/hypothetical community by quadrat method and calculation of Shannon-Weiner diversity index for the same community

**CO 03:** Study of an aquatic ecosystem: Phytoplankton and zooplankton, Measurement of area, temperature, determination of pH and free CO<sub>2</sub>

**CO 04:** Report on a visit to National Park/Biodiversity Park/Wild life sanctuary/ Biodiversity Centre

### **ZOOH - Non Chordates-II (CC-III)**

On completion of the course, students are able to understand:

**CO 01:** Evolution of coelom and metamerism, the general characteristics and classification of annelida, also studied of excretory system and metamerism

**CO 02:** The general characteristic and classification of arthropoda, also studied the vision in insecta, respiration in arthropoda, metamorphosis in lepidopteran insects and social life in termite

**CO 03:** The general characteristics and evolutionary significance of onychophora, mollusca, also studied the nervous system and torsion in gastropoda, feeding and respiration in *Pila* sp

**CO 04:** The general characteristics and classification of echinodermata, water-vascular system, larval forms, affinities with chordates

**CO 05:** The general characteristics of phylum hemichordate, relationship with non-chordates and chordates

### **ZOOH - Non Chordates II Practical (CC-III)**

On completion of the course, students are able to:

**CO 01:** Spot identified specimens of annelids, arthropods, onychophora, molluscs, echinoderms, hemichordates.

**CO 02:** Study of digestive system, septal nephridia and pharyngeal nephridia of earthworm using model and chart

**CO 03:** T.S. through pharynx, gizzard, and intestine at typhlosolar region of earthworm

**CO 04:** Mount of mouth parts and study of digestive system and nervous system of periplaneta

**CO 05:** prepare project report on any related topic on larval forms

### **ZOOH - Cell Biology (CC-IV)**

On completion of the course, students are able to understand:

**CO 01:** The Scope of cell biology, distinguishing characters between plant cell and animal cell, the whole cell organelles with their structure and function in details.

**CO 02:** The ultra structure and composition of Plasma membrane, transport across membrane and Cell junctions, the Protein sorting and mechanisms of vesicular transport

**CO 03:** Type, structure and functions of cytoskeleton, details of cell division, cell cycle and its regulation, Cancer biology, the cell signalling transduction pathways, cell interactions Apoptosis and Necrosis

### **ZOOH - Cell Biology Practical (CC-IV)**

On completion of the course, students are able to:

**CO 01:** Hand on Prepared of temporary stained squash of onion root tip to study various stages of mitosis

**CO 02:** Hand on Squash prepared of grasshopper testis and study of the various stages of meiosis.

**CO 03:** Prepared of permanent slide to show the presence of Barr body in human female blood cells/cheek cells.

**CO 04:** Study of cell viability by Trypan Blue staining from onion root tip/ blood cell

### **ZOOH - Chordate-I (CC-V)**

On completion of the course, students are able to understand:

**CO 01:** The basic concepts, origin about chordates and outline classification of phylum chordata and protochordate, classification various classes of phylum chordate i.e. Pisces, Reptiles, Aves and Mammals.

**CO 02:** The accessory respiratory organ, migration and parental caring fishes, the metamorphosis and parental care in amphibia

**CO 03:** The poison apparatus and biting mechanism in snake, the exoskeleton and migration in birds and principles and aerodynamics of flight

**CO 04:** The affinities of prototheria, exoskeleton derivatives of mammals adaptive radiation in mammals, echolocation in micro-chiropterans and cetaceans

### **ZOOH - Chordate I Practical (CC-V)**

On completion of the course, students are able to:

**CO 01:** Identify of Protochordata , Agnatha, Fishes, Amphibia, Reptilia, Mammalia

**CO 02:** Study Key for Identification of poisonous and non-poisonous snake

**CO 03:** Study Mount of Pecten from Fowl head

**CO 04:** Dissect of brain and pituitary of any major carp

**CO 05:** Prepare power point presentation on study of any animals from different classes

### **ZOOH - Animal Physiology: Controlling& Coordinating Systems (CC-VI)**

On completion of the course, students are able to understand:

**CO 01:** The structure, location, classification and functions of epithelial tissue, connective tissue, muscular tissue and nervous tissue, structure and types of bones and cartilages, ossification

**CO 02:** The structure of neuron, resting membrane potential, Origin of action potential and its propagation, also understand types of synapse, synaptic transmission and neuro-muscular junction, reflex action and its types

**CO 03:** Histology of different types of muscle, ultrastructure of skeletal muscle, Molecular and chemical basis of muscle contraction; Characteristics

**CO 04:** Histology and function of testis and ovary, physiology of Reproduction, pituitary, thyroid, pancreas and adrenal, mechanism of Hormone action: Signal transduction pathways, hypothalamus, Placental hormones

### **ZOOH - Animal Physiology: Controlling& Coordinating Systems practical (CC-VI)**

On completion of the course, students are able to:

**CO 01:** Recording of simple muscle twitch with electrical stimulation (or Virtual)

**CO 02:** Demonstration of the unconditioned reflex action (Deep tendon reflex such as knee jerk reflex)

**CO 03:** Prepare of temporary mounts: Squamous epithelium, Striated muscle fibres

**CO 04:** Identify of permanent slides of Mammalian Cartilage, Bone, Pituitary, Liver, Kidney, Intestine, Lung, Pancreas, Testis, Ovary, Adrenal, Thyroid

**CO 05:** Prepare of permanent slide of any five mammals (Goat/white rat) tissues

### **ZOOH - Fundamentals of Biochemistry (CC-VII)**

On completion of the course, students are able to understand:

**CO 01:** The structure and biological importance of carbohydrates, metabolism

**CO 01:** Physiologically important saturated and unsaturated fatty acids, The structure and biological importance of lipids, metabolism

**CO 01:** The Structure, Classification, General and Electrochemical properties of  $\alpha$ -amino acids; Physiological importance, Bonds stabilizing, protein structure, Protein metabolism

**CO 01:** The structure: purines and pyrimidines, nucleosides, nucleotides, nucleic acids; types of DNA and RNA, complementarity of DNA, Hypo-Hyper chromaticity of DNA, basic concept of nucleotide metabolism

**CO 01:** The nomenclature and classification of enzyme, Cofactors, Specificity of enzyme action, mechanism of enzyme action, enzyme inhibition, allosteric enzymes

**CO 01:** The redox systems, mitochondrial respiratory chain, Inhibitors and un-couplers of Electron

### **ZOOH - Fundamentals of Biochemistry Practical (CC-VII)**

On completion of the course, students are able to:

**CO 01:** Qualitative tests of functional groups in carbohydrates (Benedict's test), proteins (Biuret's test) and lipids (Saponification number).

**CO 02:** Demonstrate Paper chromatography of amino acids.

**CO 03:** Conduct quantitative estimation of protein by Lowry Method

**CO 04:** Demonstrate of protein separation by SDS-PAGE.

**CO 05:** Study the enzymatic activity of salivary amylase and Catalase in *Cajanuscajan*.

### **ZOOH - Comparative Anatomy of Vertebrate (CC-VIII)**

On completion of the course, students are able to understand:

**CO 01:** Structure, function and derivatives of integument in amphibian, birds and mammals, axial and appendicular skeleton, Jaw suspension, Visceral arches.

**CO 02:** Comparative anatomy of stomach, dentition in mammals, respiratory organs in fish, amphibian, birds and mammals, circulation, comparative account of heart and aortic arches, kidney, Evolution of urinogenital ducts and types of mammalian uteri

**CO 03:** Comparative account of brain, cranial nerves in mammals, sense organs, classification of receptors, auditory receptors in vertebrate

### **ZOOH - Comparative Anatomy of Vertebrates Practical (CC-VIII)**

On completion of the course, students are able to:

**CO 01:** Hand on practice of mounting of cycloid and ctenoid scales

**CO 02:** Study of disarticulated skeleton of Toad, Pigeon and Guineapig

**CO 03:** Demonstrate of Carapace and plastron of turtle from model/chart

**CO 04:** Identify of mammalian skulls: One herbivorous (Guineapig) and one carnivorous animal (Dog)

**CO 05:** Study and Dissection of Afferent arterial system, brain, pituitary in Carp

### **ZOOH - Animal Physiology: Life Sustaining Systems (CC-IX)**

On completion of the course, students are able to understand:

**CO 01:** Structure and functions of Gastrointestinal tract and associated glands; digestion of food, absorption of carbohydrates, lipids, proteins and nucleic Acids, digestive enzymes

**CO 02:** Mechanism of respiration, respiratory volumes and capacities, transport mechanism of oxygen and carbon dioxide in blood, dissociation curves and the factors, Respiratory pigments, Carbon monoxide poisoning

**CO 03:** Components of Blood and their functions, Structure and functions of haemoglobin, blood clotting system, fibrinolytic system, haemopoiesis and its regulation, ABO and Rh factor, structure of mammalian heart, Coronary Circulation, structure and function of myocardial fibres, cardiac impulses, cardiac cycle and cardiac output, blood pressure and its regulation

**CO 04:** Classification based on thermal biology, thermal biology of endotherms, Osmoregulation in aquatic vertebrates, external osmoregulatory organs in vertebrates

**CO 05:** Structure and function of kidney, mechanism of urine formation, regulation of acid-base balance

### **ZOOH - Animal Physiology: Life Sustaining Systems Practical (CC-IX)**

On completion of the course, students are able to:

**CO 01:** Determine of ABO Blood group

**CO 02:** Enumerate of red blood cells and white blood cells using haemocytometer

**CO 03:** Estimate of haemoglobin using Sahli's haemoglobinometer

**CO 04:** Prepare of haemin crystals

**CO 05:** Record of blood pressure using a sphygmomanometer

### **ZOOH - Immunology (CC-X)**

On the completion of the course students are able to understand:

**CO 01:** Basic concepts of health and diseases, immune system, anatomical barriers, inflammation, concept of innate and adaptive immunity, antigenicity, immunogenicity, immunogens, adjuvants and haptens; factors of immunogenicity, T-cell epitopes

**CO 02:** Structure and functions of immunoglobulin's, antigen-antibody reaction, immunoassays (ELISA and RIA), hybridoma, monoclonal antibody; structure and functions of MHC molecules, structure of T-cell receptor and its signaling; T-cell development, types, properties and functions of cytokines.

**CO 03:** Complement pathways, classifications of hypersensitivities, Malaria, filariasis, dengue and tuberculosis, various types of vaccines. active & passive immunization (artificial and natural)

### **ZOOH - Immunology Practical (CC-X)**

On the completion of the course students are able to:

**CO 01:** Demonstrate of lymphoid organs in human through model/ photograph

**CO 02:** Prepare histological study of spleen, thymus and lymph nodes through slides/photographs

**CO 03:** Prepare of stained blood film to study various types of blood cells.

**CO 04:** Total count (TC) & Differential count (DC) of WBC

**CO 05:** Demonstrate of ELISA by available teaching kit

### **ZOOH - Molecular Biology (CC-XI)**

On the completion of the course students are able to understand:

**CO 01:** Characters of DNA and RNA, Watson and Crick model of DNA, mechanism of DNA replication, semi-conservative, bidirectional and discontinuous replication, RNA priming, Replication in telomeres

**CO 02:** Mechanism of transcription, transcription factors, difference between prokaryotic and eukaryotic transcription, mechanism of translation with ribosome structure and assembly, aminoacyl tRNA synthetases and charging of tRNA, genetic code and Wobble hypothesis, difference of prokaryotic and eukaryotic translation

**CO 03:** Capping and poly A tail formation in mRNA, concepts of exons and introns, splicing mechanism and RNA editing, Processing of tRNA, lac operon, trp operon, regulation of transcription in prokaryotes and eukaryotes, miRNA mediated gene silencing, genetic imprinting

**CO 04:** Types of DNA Repair mechanisms, RecBCD model, nucleotide, base excision and SOS repair, molecular techniques: PCR, Western, Southern & Northern Blot & Sanger DNA sequencing

### **ZOOH - Molecular Biology Practical (CC-XI)**

On the completion of the course students are able to:

**CO 01:** Prepare of polytene chromosome from Diptera (*Chironomus/ Drosophila/ Mosquito larva*)

**CO 02:** Identify of polytene and lampbrush chromosome from photograph

**CO 03:** Isolate and quantify of genomic DNA using spectrophotometer (A260 measurement) (demonstration only)

**CO 04:** Demonstrate of agarose gel electrophoresis for DNA

**CO 05:** Study and interpretate of electron micrographs/ photographs showing-DNA replication, Transcription, Split genes

**CO 06:** Prepare of liquid and solid bacterial culture media, slant and stab

**CO 07:** Demonstrate of antibiotic sensitivity/ resistance of bacteria to antibiotic discs

### **ZOOH – Genetics (CC-XII)**

On the completion of the course students are able to understand:

**CO 01:** Principles of inheritance, incomplete dominance, co-dominance, epistasis, multiple and lethal alleles, pleiotropy, sex-linked, sex-influenced, sex-limited and polygenic inheritance; Linkage, Crossing Over and Chromosomal Mapping, measuring Recombination frequency, interference and coincidence



**CO 02:** Types of gene mutations, Types of chromosomal aberrations, non-disjunctions and variation in chromosome number, Molecular basis of mutations; Sex Determination in *Drosophila* and mammals, Dosage compensation in *Drosophila* and human

**CO 03:** Extra chromosomal inheritance, Antibiotic resistance in *Chlamydomonas*, kappa particle in *Paramecium*, shell spiraling in snail; conjugation, transformation, transduction and complementation test in Bacteriophage; Transposons in bacteria, Ac-Ds elements in maize and P elements in *Drosophila*, LINE, SINE, Alu elements in humans

### **ZOOH - Genetics Practical (CC-XII)**

On the completion of the course students are able to:

**CO 01:** Chi-square analyses

**CO 02:** solve problems of linkage maps on *Drosophila*

**CO 03:** Identify of chromosomal aberration in *Drosophila* (inversion, ring chromosome, paracentric inversion) from photograph

**CO 04:** Study of human karyotype, normal and abnormal (Down, Klinefelter, Turner's, Cri-du-Chat) from photograph

**CO 05:** Pedigree analysis of some human inherited traits (X-linked dominant, X-linked recessive, autosomal dominant, autosomal recessive, Y-linked)

### **ZOOH - Developmental Biology (CC-XIII)**

On the completion of the course students are able to understand:

**CO 01:** Phases of Development, Cell cell interaction, Differentiation and growth, Differential gene expression; Spermatogenesis, Oogenesis, Fertilization, Cleavage, Types of blastula, Fate Maps (including techniques), early development of frog and chick, embryonic induction and organizers

**CO 02:** Fate of germ layers, Extra embryonic membranes in bird, implantation of embryo in humans and placenta with types and functions

**CO 03:** Teratogenic agents and their effects, In vitro fertilization, Stem cell(ESC), Amniocentesis

### **ZOOH - Developmental Biology Practical (CC-XIII)**

On the completion of the course students are able to:

**CO 01:** Identify of whole mounts of developmental stages of chick through permanent slides: Primitive streak (13 to 18 hours), 21-33h, 36-48h and 72-96 hours of incubation (Hamilton and Hamburger stages)

**CO 02:** Study of the developmental stages and lifecycle of *Drosophila* from stock culture

**CO 03:** Study and identification of different sections of placenta (through photo micrograph/slides)

**CO 04:** Prepare project report on *Drosophila* culture/chick embryo development

### **ZOOH - Evolutionary Biology (CC-XIV)**

On the completion of the course students are able to understand:

**CO 01:** Chemogeny, RNA world, Biogeny, Origin of Photosynthesis, Evolution of eukaryotes; Historical review of Evolutionary concepts, Lamarckism, Darwinism and Neo-Darwinism; Geological time scale, Fossil records of Hominids, evolution of horse, Neutral theory of molecular evolution, Molecular clock

**CO 02:** Heritable variations and its role, Hardy-Weinberg Law, H-W equilibrium; Natural selection, Genetic drift mechanism, Role of migration and mutation in changing allele frequencies; Species concept, Isolating mechanisms, modes of speciation, Adaptive radiation/macroevolution

**CO 03:** Causes and effects of extinctions, K-T extinction; Origin and Evolution of Man, Hominin characteristic, Molecular analysis of human origin; Phylogenetic trees, Parsimony, Convergent and Divergent Evolution

### **ZOOH - Evolutionary Biology Practical (CC-XIV)**

On the completion of the course students are able to:

**CO 01:** Study of fossils from models/pictures, homology and analogy from suitable specimens

**CO 02:** Study and verification of Hardy-Weinberg Law by chi-square analysis

### **ZOOH - Animal Biotechnology (DSE-I)**

On the completion of the course students are able to understand:

**CO 01:** Organization of prokaryotic and eukaryotic genome, Concept of genomics, Plasmids, Cosmids, Phagemids, Lambda Bacteriophage, M13, BAC, YAC, MAC and Expression vectors, Restriction enzymes, Transformation techniques, Construction of genomic and cDNA libraries, Southern, Northern and Western Blotting, DNA sequencing, Polymerase Chain Reaction, DNA Fingerprinting and DNA microarray

**CO 02:** Nuclear Transplantation, Retroviral Method, DNA microinjection, Production of pharmaceuticals, production of donor organs, knockout mice.

**CO 03:** Animal cell culture, Expressing cloned genes in mammalian cells, Molecular diagnosis of genetic diseases (Cystic fibrosis, Sickle cell anaemia)

### **ZOOH - Animal Biotechnology Practical (DSE-I)**

On the completion of the course students are able to:

**CO 01:** Construction of linear restriction map from the data provided.

**CO 02:** Calculation of transformation efficiency from the data provided.

**CO 03:** Study and identification of following techniques through photographs: Southern Blotting, Northern Blotting, Western Blotting, DNA Sequencing (Sanger's Method), PCR, DNA fingerprinting

**CO 04:** prepare project report on animal cell culture

### **ZOOH - Parasitology (DSE-II)**

On the completion of the course students are able to understand:

**CO 01:** Brief introduction of Parasitism, Parasite, Parasitoid and Vectors, Host parasite relationship

**CO 02:** Morphology, Life cycle, Prevalence, Epidemiology, pathogenecity, Diagnosis, Prophylaxis and Treatment of *Giardia*, *Trypanosoma*, *Leishmania*, *Schistosoma*, *Taenia*, *Ascaris*, *Ancylostoma*, *Wuchereria*, *Tricchinella* and *Brugia*, Gall formation

**CO 03:** Biology, importance and control of ticks, mites, lice, flea and bug; Brief account of Cookicutter Shark, Hood Mocking bird, Vampire bat

### **ZOOH - Parasitology Practical (DSE-II)**

On the completion of the course students are able to:

**CO 01:** Identify of life stages of *Giardia lamblia* and *Leishmania donovani* through permanent slides/microphotographs

**CO 02:** Identify of adult and life stages of *Schistosoma haematobium*, *Taeniasolium* through permanent slides/microphotographs

**CO 03:** Identify of adult and life stages of *Ancylostoma duodenale*, *Wuchereria bancrofti* and *Trichinella spiralis* through permanent slides/microphotographs

**CO 04:** Identify of plant parasitic root knot nematode, *Meloidogyne* from the soil sample

**CO 05:** Identify of *Pediculus humanus*, *Xenopsyll acheopis* and *Cimex lectularius* through permanent slides/photographs

**CO 06:** Isolate and fixation of nematode/cestode parasites from the intestine of hen [Intestine can be procured from poultry/market as a by-product]

**CO 07:** Prepare project report on any parasite of vertebrates

### **ZOOH - Animal Behaviour (DSE-III)**

On the completion of the course students are able to understand:

**CO 01:** Origin and history of Ethology, Brief profiles of Karl Von Frish, Ivan Pavlov, Konrad Lorenz, NikoTinbergen, Proximate and ultimate causes of behaviour, Methods and recording of a behavior; Stereotyped Behaviours, Individual Behavioural patterns, Instinct vs. Learnt Behaviour, Associative learning, classical and operant conditioning, Habituation, Imprinting

**CO 02:** Concept of Society, Communication and the senses, Altruism; Insects, Asymmetry of sex, Sexual dimorphism, Mate choice, Intra-sexual selection, Inter-sexual selection, Sexual conflict in parental care; Historical developments in chronobiology, the concept of Average, amplitude, phase and period, Adaptive significance of biological clocks

**CO 03:** Short- and Long- term rhythms, Circadianrhythms, Tidal rhythms and Lunar rhythms, Photic and non-photic zeitgebers, Circannualrhythms, Photoperiod and regulation of seasonal reproduction of vertebrates, Role of melatonin

### **ZOOH - Animal Behaviour Practical (DSE- III)**

On the completion of the course students are able to:

**CO 01:** Study of nests and nesting habits of the birds and social insects.

**CO 02:** Study of the behavioral responses of woodlice to dry and humid conditions.

**CO 03:** Study of geotaxis behaviour in earthworm.

**CO 04:** Study of photo taxis behaviour in insect larvae.

**CO 05:** prepare a short report on behavioural activities of animals from Forest/Wildlife Sanctuary/Biodiversity Park/Zoological Park

**CO 06:** Study and actogram construction of locomotor activity of suitable animal models.

**CO 07:** Study of circadian functions in humans (daily eating, sleep and temperature patterns)

### **ZOOH - Endocrinology (DSE-IV)**

On the completion of the course students are able to understand:

**CO 01:** Classification, Characteristics and Transport of Hormones, Neurosecretions and Neurohormones; Structure Secretions and functions of pineal gland, Structure and functions of hypothalamus and Hypothalamic nuclei, Regulation of neuroendocrine glands, Feedback mechanisms,

Structure Hormones and functions of pituitary gland, Hypothalamo- hypophysial portal system, Disorders of pituitary gland

**CO 02:** Structure, Hormones, Functions and Regulation of Thyroid gland, Parathyroid, Adrenal, Pancreas, Ovary and Testis, Hormones in homeostasis, Disorders of endocrine glands

**CO 03:** Mechanism of action of steroidal, non-steroidal hormones, Bioassays of hormones using RIA & ELISA, Estrous cycle in rat and menstrual cycle in human, role of Vasopressin & Oxytocin, Hormonal regulation of parturition

### **ZOOH - Endocrinology Practical (DSE-IV)**

On the completion of the course students are able to understand:

**CO 01:** Dissect and display of Endocrine glands in laboratory bred rat.

**CO 02:** Study of the permanent slides of all the endocrine glands (Thyroid, Adrenal, Pancreas, Testis and Ovary)

**CO 03:** Tissue fixation, embedding in paraffin, microtomy and slide preparation of any endocrine gland

**CO 04:** Demonstrate of hormone assay through ELISA from available teaching kit

### **ZOOH - Apiculture (SEC-I)**

End of the course, students are able to understand:

**CO 01:** Classification and biology of Honey Bees, Bee colony; Artificial Bee rearing, Bee Pasturage, Selection of Bee species, Bee Keeping Equipment, Methods of Honey extraction

**CO 02:** Bee Disease and enemies, control and Preventive measure; Apiculture Industry and uses; Modern Methods in artificial Beehives for cross pollination

### **ZOOH - Aquarium Fish Keeping (SEC-II)**

End of the course, students are able to understand:

**CO 01:** Exotic and Endemic species of Aquarium; Sexual Dimorphism of Freshwater and Marine Aquarium fishes

**CO 02:** Use of live fish feed organisms, Preparation of formulated fish feed, Aquarium fish as larval predator, Fish handling, packing and forwarding techniques; Aquarium maintenance

## **PROGRAMME OUTCOMES**

**PO-1:** Students will be able to identify the major groups of organisms with an emphasis on animals and be able to classify them within a phylogenetic framework. Students will be able to compare and contrast the characteristics of animals that differentiate them from other forms of life.

**PO-2:** Students will be able to use the evidence of comparative biology to explain how the theory of evolution offers the only scientific explanation for the unity and diversity of life on earth. They will be able to use specific examples to explicate how descent with modification has shaped animal morphology, physiology, life history, and behavior.

**PO-3:** Students will be able to explicate the ecological interconnectedness of life on earth by tracing energy and nutrient flows through the environment. They will be able to relate the physical features of the environment to the structure of populations, communities, and ecosystems.

**PO-4:** Students will be able to explain how organisms function at the level of the gene, genome, cell, tissue, organ and organ-system. Drawing upon this knowledge, they will be able to give specific examples of the physiological adaptations, development, reproduction and behavior of different forms of life.

**PO-5:** Students will be proficient to apply the scientific method to questions in the laboratory work of biology and also able to present scientific hypotheses and data both orally and in writing in the formats that are used by practicing scientists.

**PO-6:** There will be capable for different scopes in different areas like sericulture and apiculture department as demonstrator, care taker of the farm, trainer for others etc.

**PO-7:** Students will be also capable in the department of Fisheries as extension officer, care taker, induced breeders, management, marketing, aquaculture like breeding and rearing of ornamental fishes either local or exotic. In case of self employment apiculture, sericulture, fisheries and lac culture are the important areas are covered by zoology.

**PO-8:** Students gain through knowledge on environmental science in their Zoology course, may help to solve environment related problem in our society like Pollution which is a burning problem of modern days.

**PO-9:** Pathology laboratory needs technician for different analytical purposes and in forensic laboratory also need so, the zoology student may be treated as key persons.

**PO-10:** Beside these in higher studies in different curriculum the students of zoology may be engaged such departments are Zoological Survey of India, Archeology, Museum curator, wild life management, wild life documentation and photographer, food processing etc.