Department of Zoology

Program Outcomes, Program Specific Outcomes and Course Outcomes of

B.Sc. in Zoology

B. Sc. (Zoology) Programme

B.Sc. in Zoology is an undergraduate Program in Zoology. Zoology is the branch of science which deals with the study of animal kingdom including the evolution, structure, Physiology, classification, embryology, habits, habitat and distribution of all the animals. The B.Sc. Zoology course is premeditated to introduce students to the study of zoology at the organismal and organ function levels. The theoretical part of the program deals with the general principles of classical as well as modern zoology. The program provides the student with an introduction to the recent advances in zoology in the areas of systematic, evolution, reproduction, development, animal diversity, biochemistry, cytology and animal ecology. This course is offered for candidates who are interested in the study of animals. The minimum time required to complete the course is three years.

Objectives:

Imparting quality education in Zoology has been the focus of the department right from its inception. Emphasis is given on education both within and outside the classroom.

The Department is dedicated to fulfil the following objectives through the curricular and cocurricular activities:

- To provide students with knowledge of fundamental principles in zoology that will provide a foundation for their later advanced course in more specific biological subjects.
- To make students familiar with animal classification schemes and other applied courses as well as developing an understanding of and ability to apply basic zoological principles.
- To integrate the laboratory and lecture sections of the course and directed toward teaching students both in the classroom and on the field.
- To provide quality education offering skill based programs and motivate the students for self-employment in applied branches of Zoology.
- To inculcate the value based education and entrepreneurial skills among the students.
- To create awareness on environmental issues through various activities.

Programme Outcomes:

After successfully completing B**. Sc. (Zoology)** Programme students will be able to:

PO1. Communicate scientific information through effective formal and informal methods generally used in sciences.

PO2. Conduct basic scientific research and provide inputs for societal benefits.

PO3. Develop competence in basic sciences and in the content of the specific courses

that constitute the principal knowledge of their degree.

PO4. Compare and contrast the characteristics of animals that differentiate them from other forms of life.

PO5. Acquire the skills in handling scientific instruments, planning and performing in laboratory experiments.

PO6. Understand and be aware of relevant theories, paradigms, concepts and principles of zoology.

PO7: Understand the structure and functions of cell types

PO8: Acquire time management and self-management skills.

PO9: Relate the various abiotic factors with health of living forms and ecosystems.

PO10: Explain the role of various biomolecules in living systems

PO11: Apply the knowledge of Zoology to understand the complex life life Processes and phenomena.

PO12: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning.

Programme Specific Outcomes

PSO1. Ability to connect and apply biological knowledge to other disciplines and to integrate knowledge into their personal and professional lives.

PSO2. Explain the origin of life with context to the origin of eukaryotic cell and endosymbiotic theory of origin., fossil records, Darwinism and Neo-Darwinism, experimental evidences.

PSO3. Illustrate zoological science for its application in branches like medical entomology, apiculture, aquaculture and agriculture etc

PSO4. Understand animal interactions with the environment and identify the major groups of organisms with an emphasis on animals and classify them within a phylogenetic framework.

Course Outcomes

B. Sc. (Zoology) First Year B.Sc.

Course ZY 101 -Animal Systematics and Diversity I & II

After successfully completing this course, students will be able to:

CO1: Demonstrate anatomical and physiological attributes of each animal group and why these have led to their success.

CO2: Identify a range of invertebrate and vertebrate animals

CO3: Describe the morphology, habit and habitat. Systematic position and various systems in *Paramecium.*

CO4: Describe the morphology, habit and habitat. Systematic position and various systems in Frog.

CO5: List the various animals in a given phylum.

CO6: State the animal classification.

CO7: Enlist the examples of the phylums studied.

CO8: Comment on the modifications of common animal forms of the groups studied.

Course: ZY 102

Fundamentals of Cell Biology; Genetics.

After successfully completing this course, students will be able to:

CO1: Differentiate prokaryotic and Eukaryotic cells.

CO2: Explain the principles of staining.

CO3: Describe the structure and functions of cell organelles.

CO4: Label the various cell parts and Cell organelles.

CO5: Explain the cell division process and its significance.

CO6: Explain Mendel's principle, its extension and chromosomal basis and determination of gene action from genotype to phenotype and concepts of inheritance.

CO7: Define the terminologies in genetics.

CO8: Describe the chromosome anomalies and associated diseases

Course: ZY 103 Practicals in Zoology:

After successfully completing this course, students will be able to:

CO1: Identify various animals based on morphological features.

CO2: Prepare the culture of *Paramecium*

CO3: Prepare stained slides of mitosis.

CO4: Identify the cell division phases

CO5: Detect human blood group

CO6: Identify the human genetic traits.

CO7: Identify the cell organelles.

CO8: Explain the morphology and sexual dimorphism of *Drosophila* and Frog.

B. Sc. (Zoology) Second Year B.Sc.

Course ZY 211-Animal Systematics and Diversity III.

After successfully completing this course, students will be able to:

CO1: List the various animals in a given phylum of invertebrates

CO2: Identify various larval stages and development in invertebrate groups

CO3: Explain various modifications in these groups and the need of the modification for survival.

CO4: Explain various adaptations in insects including mimicry and metamorphosis

CO5: Describe the morphology, habit and habitat, systematic position and various systems in Star fish.

CO6: State the outline of animal classification of non-chordates

CO7: Classify the higher invertebrate groups.

CO8: Categorize the diversity found in the invertebrate groups of animals like Arthropoda, Mollusca and Echinodermata.

Course ZY 212: Applied Zoology I

After successfully completing this course, students will be able to:

CO1: Define the concepts of the applied subjects like Fisheries, Aquaculture and Pest Control.

CO2: Identify, freshwater, Marine water fishes.

CO3: Explain the tools and techniques used in aquaculture and agricultural practices.

CO4: Describe the fish species commonly used in fishery business.

CO5: Describe the common agricultural pests from nearby area.

CO6: Illustrate the diseases in aquaculture and agriculture.

CO7: Classify freshwater and Marine water fishes.

CO8: Categorize economically important fish species.

Course ZY 221-Animal Systematics and Diversity IV.

After successfully completing this course, students will be able to:

CO1: List the various vertebrate animals in a given class.

CO2: Identify poisonous and non-poisonous snakes.

CO3: Explain various modifications in the given group of animals.

CO4: Explain various adaptations in avian group as well as migration and flight in birds.

CO5: Describe the morphology, habit and habitat. Systematic position and various systems in *Scoliodon*.

CO6: State the outline of chordate classification.

CO7: Classify the higher vertebrate groups.

CO8: Categorize the diversity found in the vertebrate groups of animals like reptiles, birds and mammals.

Course ZY 222: Applied Zoology II

After successfully completing this course, students will be able to:

CO 1: Define the concepts of the applied subjects like Apiculture and Sericulture.

CO 2: Identify different species and casts of honeybees and species of silkworm.

CO 3: Explain the tools and techniques used in apiculture and sericulture.

CO 4: Explain the important pests of apiculture and sericulture.

CO 5: Describe the economic importance of honeybee and silkworm.

CO 6: Illustrate management of the apiary and sericulture units.

CO 7: Classify of *Apis, Bombyx* and *Anthereria.*

CO 8: Select economically important species of *Apis* for unifloral and multifloral honey production.

Course ZY 223: Practicals in Zoology:

After successfully completing this course, students will be able to:

CO1: Identify animals of higher groups in Invertebrates and Vertebrates.

CO2: Distinguish between poisonous and non-poisonous snakes

CO3: Label various parts of the animals and their modifications

CO4: Observe the various tools, crafts and gears used in Apiary, Fishery, Sericulture and Pest control.

CO5: Identify the pests in agriculture and enemies in Apiary

CO6: Explain the modifications and adaptations in animals

CO7: Explain the use of tools in Apiary, Sericulture and appliances in Pest control.

CO8: Describe External features and economic importance of freshwater and Marine water fishes and other aquaculture organisms

CO9: Describe the morphology, habit and habitat. Systematic position and various systems in starfish and *Scoliodon*

B. Sc. (Zoology) Third Year B.Sc.

Course ZY 331: Animal Systematics & Diversity V

After successfully completing this course, students will be able to:

CO1: Outline the systematic position of *Pila globosa*. and *Calotes versicolor*

CO2: Label the organs and systems of Pila *globosa*. and *Calotes versicolor*

CO3: Describe the major features in the Phylum Protozoa, Porifera, Coelenterata and Hemichordata and the reason of their success in the ecosystem.

CO4: Explain the functional anatomy of *Pila globosa*. and *Calotes versicolor*

CO5: Illustrate the morphological peculiarities of Integument, Heart, Kidney and Brain of vertebrates

CO6: Categorize the Accessory respiratory organs in fish.

CO7: Classify the dentition in mammals.

CO8: Justify the need of electric organs in fish.

Course ZY 341: Biological techniques

After successfully completing this course, students will be able to:

CO1: Define the basic terms solution preparation.

CO2: List the separation techniques.

CO3: Describe the techniques used in hematology.

CO4: Explain the principle of separation techniques.

CO5: Explain the procedure of preparing permanent histological slides.

CO6: Illustrate the working of microscopes.

CO7: Analyze the dimensions of the biological samples.

CO8: Justify the selection of fixatives for histological procedures.

Course ZY 332: Mammalian Histology

After successfully completing this course, students will be able to:

CO1: Define the basic terms in histology.

CO2: List the various types of tissues.

CO3: Identify the histological peculiarities in various organs.

CO4: Explain the location, structure and functions of various organs.

CO5: Illustrate the histology of endocrine glands.

CO6: Diagrammatically represent the various organs.

Course ZY- 342: Mammalian Physiology & Endocrinology

After successfully completing this course, students will be able to:

CO1: Define the basic terms in physiology.

CO2: List the various types of digestive enzymes.

CO3: Explain the physiological processes in mammals.

CO4: Explain the anatomy of various systems.

CO5: Illustrate the reproductive cycles with hormonal control.

CO6:.Daigramatically represent the working of kidney.

CO7: Justify the endocrine disorders.

Course ZY 333 Biological Chemistry

After successfully completing this course, students will be able to:

CO1: Define the basic terms in biochemistry.

CO2: Explain the structure, functions and reactions of the various biomolecules.

CO3: Give examples of each group type of biomolecules.

CO4: Correlate the changes in the levels of these biomolecules with the diseases in human

CO5: Calculate pH and pOH of buffer solution.

CO6: Classify the biomolecules.

CO7: Draw the structures of major biomolecules.

Course ZY 343 Genetics & Molecular biology

After successfully completing this course, students will be able to:

CO1: Define the basic terms in genetics.

CO2: Discuss the linkage groups and gene frequency.

CO3: Explain the concept of mutation.

CO4: Explain DNA structure.

CO5: Paraphrase the Central dogma of molecular biology.

CO6: Illustrate the mechanism of replication, transcription and translation.

CO7: Justify the post transcriptional and post translational modifications.

Course ZY- 334 Environmental Biology & Toxicology

After successfully completing this course, students will be able to:

CO1: List the environmental challenges and their remedies.

CO2: Describe the nature of ecosystem, productivity, food webs, energy flow,

CO3: Describe the resilience of ecosystem and ecosystem management.

CO4: Explain Biosphere, biomes and impact of climate on biomes.

CO5: Explain wildlife management in India and conservation of wildlife.

CO6: Explain the three necessary and sufficient conditions i.e. struggle for existence; variation; and inheritance.

CO7: Illustrate the toxic effects of chemicals in the environment on human and his livestock.

CO8: Discuss natural resources, causes of their depletion and their conservation.

Course ZY 344: Organic Evolution:

After successfully completing this course, students will be able to:

CO 1: Define organic evolution.

CO 2: Explain the theories of organic evolution.

CO 3: Describe the concept of origin of life and theories of origin of life.

CO 4: Describe evolution of man.

CO 5: Illustrate the presence of organisms at various geological time scale.

CO 6: Apply the knowledge in relevant experimentations.

CO 7: Categorize different zoogeographical realms.

CO 8: Compare animal distribution in different zoogeographical realms.

Course ZY 335 Parasitology

CO 1: Define the basic terms in parasitology.

CO2: List common ectoparasites and endoparasites.

CO3: Explain animal associations and their types.

CO4: Discuss the life cycle and importance of major parasites.

CO5: Illustrate transmission routes of animal and zoonotic parasites

CO6: Classify parasites.

CO7: Justify the control measures of arthropod vectors.

CO8: Convince the importance of hygiene with respect to epidemic diseases.

Course ZY 345 General Embryology

After successfully completing this course, students will be able to:

CO1: Identify the developmental stages

CO2: Describe the key events in early and systematic embryological development.

CO3: Describe the process of gametogenesis.

CO4: Describe the chick development up to 96 hours of incubation and extra embryonic membranes.

CO5: Explain the life cycles of few parasites.

CO6: Explain the theories of preformation, and concepts like growth, differentiation and reproduction.

CO7: Explain the principles and process of fertilization and cleavage.

CO8: Prepare the flow chart of gametogenesis process.

Course ZY 336 Cell Biology

After successfully completing this course, students will be able to:

CO1: Define the terms in cell bilogy

CO2: Describe the composition, structure and functions of the plasma membrane.

CO3: Explain the structure and functions of the nucleus and its components.

CO4: Describe the three primary components of the cell’s cytoskeleton and how they

affect cell shape, function, and movement.

CO5: Diagrammatically represent the phases of division of somatic and gametic cells.

CO6: Differentiate between prokaryotes and eukaryotes.

CO7: Differentiate between rough and smooth endoplasmic reticulum both in structure and function.

Course ZY 346 Medical Entomology

After successfully completing this course, students will be able to:

CO1: Outline the branches of entomology.

CO2: Define medical entomology.

CO3: Explain the social organization of insects with examples.

CO4: Illustrate the role of household insects in relation to human health.

CO5: Classify major medically important insects.

CO6: Justify the significance of social organization in insects.

CO7: Choose the control measures of medically important insects

Course ZY 347 Practical Paper I

After successfully completing this course, students will be able to:

CO1: Identify the organs by studying the histological slides.

CO2: Identify hormonal disorders using pictures.

CO3: Use techniques like chromatography, spectrophotometry in biological experiments.

CO4: Explain the anatomical features of brain, heart, kidney and skin of vertebrates.

CO5: Demonstrate the importance of modifications in animal for their survival.

CO6: Demonstrate the structure of tissues by making temporary slides.

CO7: Demonstrate haemin crystals and effect of osmolarities on RBCs.

CO8: Sketch and label the various systems and organs of *Pila, Balanoglossus* and *Calotes*.

CO9: Prepare blood smear and identify the various cells.

CO10: Draw exact figures of structures/organism using camera lucida.

CO11: Measure the cell/organism dimensions.

CO12: Prepare blood smear and identify the various cells.

CO13: Process animal tissues and prepare permanent histological slides.

CO14: Count total leucocytes from blood samples.

CO15: Estimate the Hb.level in blood samples.

CO16: Estimate blood glucose level, BT and CT.

Course ZY 348 Practical Paper II

After successfully completing this course, students will be able to:

CO1: Identify the fossil types/ adaptations in animals.

CO2: Explain the stages of human evolution.

CO3: Demonstrate the effect of physical and chemical factors on enzyme activity.

CO4: Explain the evidences of evolution

CO5: Demonstrate physical and chemical properties of water and soil samples.

CO6: Illustrate the application of Hardy –Weinberg law

CO7: Detect given carbohydrates using biochemical tests.

CO8: Measure the pH of given samples.

CO9: Isolate protein from milk.

CO10: Prepare acid and base solutions and titrate them.

CO11: Collect and identify freshwater planktons.

CO12: Determine LD_{50} and LC_{50}.

CO13: Estimate nucleic acids in given samples.

CO14: Elucidate the difference between ape and man.

CO15: Prepare temporary mounting of Giant chromosome.

CO16: Prepare paper model of DNA.

CO17: Record zoogeographical distribution of animals.

Course ZY 349 Practical Paper III

After successfully completing this course, students will be able to:

CO1: Identify the life cycle stages of few parasites.

CO2: Identify and explain the types of eggs, blastulae and grastrulae

CO3: Identify the age of chick embryo.

CO4: Identify the phases of cell division.

CO5: List the household Pest and social insects.

CO6: Explain the pathogenicity and morphology of few ectoparasites.

CO7: Explain the diseases spread by vectors.

CO8: Explain the interrelationship of insects and human with examples.

CO9: Explain the effects of household insects on human health.

CO10: Demonstrate rectal parasites in cockroach.

CO11: Demonstrate Mitochondria/ mitotic and meiotic stages by stained preparations.

CO12: Illustrate the social organization in insects.

CO13: Prepare temporary slide of chick embryo to identify the stage and age.

CO14: Prepare mounting of mouth parts of few common insects.

CO15: Justify the effect of colchicine on cell division.

Program Outcomes, Program Specific Outcomes and Course Outcomes of

M.Sc. in Zoology

M. Sc. (Zoology) Programme

Programme Outcomes:

After successfully completing M**. Sc. (Zoology)** Programme students will be able to:

PO1. **Zoology knowledge**: Apply the knowledge of Zoology, Life Sciences and allied subjects to the understanding of complex life Processes and phenomena.

PO2. **Problem analysis**: Identify, review research literature, and analyse complex situations of living forms.

PO3. **Design/development of solutions**: Design processes/strategies that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO4. **Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO5. **Modern tool usage**: Create, select, and apply appropriate techniques, resources, and ICT tools for understanding of the subject.

PO6. **The Postgraduate and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO7. **Environment and sustainability**: Understand the impact of the natural and anthropogenic activities in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development. Identify a range of invertebrates and vertebrates and justify their conservation.

PO8. **Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the work/research practice.

PO9. **Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO10. **Communication**: Communicate effectively on complex life activities with the scientific community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO11. **Project management and finance**: Demonstrate knowledge and understanding of Zoology and management principles and apply these to one’s own work, as a member and leader in a team.

PO12. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Programme Specific Outcomes

After successfully completing M**. Sc. (Zoology)** Programme students will be able to:

PSO1. Explain how organisms function at the level of the gene, genome, cell, tissue, organ and organ-system and develop theoretical and practical knowledge in handling the animals and using them as model organism

PSO2. Illustrate physiological adaptations, development, reproduction and behaviour of different forms of life.

PSO3. Illustrate zoological science for its application in branches like medical entomology, apiculture, aquaculture and agriculture etc.

PSO4. Develop proficiency in the experimental techniques and methods of analysis appropriate for their area of specialization and relate concepts of comparative biology to explain evolution and success to live in varied environment

Course Outcomes

M. Sc. (Zoology) First Year, Semester I.

Course ZY 101 T –Biochemistry I

After successfully completing this course, students will be able to:

CO1: Define basic terms in biochemistry.

CO2: Explain the chemistry of life.

CO3: Explain the structure and functions of various biomolecules.

CO4: Explain the importance of vitamins and coenzymes and disorders related to them.

CO5: Illustrate the importance of pH, buffer and water in living systems.

CO6: Draw the structures of various carbohydrates and amino acids.

CO7: Classify enzymes with examples.

Course: ZY 101 P Practicals in Biochemistry-I:

After successfully completing this course, students will be able to:

CO1: Prepare various acid and base solutions of desired strength.

CO2: Prepare buffers of desired pH.

CO3: Estimate sugar, amino acid, protein, α-nitrogen and vitamin.

CO4: Isolate protein and enzymes from biological source.

CO5: Determine the saponification value of fat and oil.

- **Course: ZY 102T Cell Biology:**

After successfully completing this course, students will be able to:

CO1: Label the various cell parts

CO2: Sketch and label various types of cells and cell organelles.

CO3: Explain carbon as backbone of biomolecules.

CO4: Explain the ultrastructure and functions of various cell organelles.

CO5: Describe the Nucleo-Cytoplasmic interactions.

CO6: Illustrate the chemistry and organization of cytoskeleton.

CO7: Diagrammatically represent the cell cycle phases and its regulation.

Course ZY 102 P Practicals in Cell Biology

After successfully completing this course, students will be able to:

CO1: Prepare temporary slide of animal cells.

CO2: Measure the cell dimensions.

CO3: Demonstrate meiosis and mitosis in given material.

CO4: Sketch, label and identify various cells and ultrastructure of cell organelles.

CO5: Isolate the subcellular organelles.

CO6: Justify the significance of aseptic experimental conditions in cell biology.

Course ZY 103T Genetics:

After successfully completing this course, students will be able to:

CO1: Identify genetic disorders based on Karyotypes and traits.

CO2: Explain the concept of Mendelian genetics, gene, gene regulation and multiple alleles.

CO3: Discuss Linkage and crossing with their types and significance.

CO4: Explain the principles of Population genetics.

CO5: Illustrate the modified Mendelian laws of inheritance.

CO6: Justify the inheritance of qualitative and quantitative traits.

CO7: Solve the problems based on gene frequency.

Course ZY 103P Practicals in Genetics:

After successfully completing this course, students will be able to:

CO1: Identify the inheritance of diseases using pedigree chart.

CO2: Prepare stained slide of Giant Chromosome.

CO3: Prepare Media for bacterial culture and observe colony formation and growth curve.

CO4: Determine the gene order, distance and map from given data of crossing over.

CO5: Solve the numerical problems based on Sex linked inheritance, Monohybrid and dihybrid crosses.

CO6: Solve the problems based on Hardy-Weinberg law.

Course ZY104T Biostatistics:

After successfully completing this course, students will be able to:

CO1: Explain the application of sampling in biological sciences**.**

CO2: Explain standard Probability distributions.

CO3: Explain the concept and types of central tendency.

CO4: Explain the concept of correlation and regression with their properties.

CO5: Classify the given data.

CO6: Graphically represent the given data.

CO7: Illustrate the measures of dispersion with examples.

CO8: Solve statistical problems.

Course ZY104P Practicals in Biostatistics:

After successfully completing this course, students will be able to:

CO1: Construct frequency distribution chart.

CO2: Graphically represent the given data.

CO3: Solve the statistical problems based on Central Tendency, Dispersion, Correlation and regression.

CO4: Apply computer software for statistical analysis.

CO5: Solve numerical problems on test of hypothesis using biological data.

Course ZY105T Skills in Scientific communication and writing:

After successfully completing this course, students will be able to:

CO1: Write the outline of a scientific paper.

CO2: Write the title, abstract, discussion and citations of a given scientific article.

CO3: Prepare a scientific presentation using PowerPoint.

CO4: Explain language as a tool for effective scientific communication.

CO5: Use the formal elements of specific types of scientific writing.

CO6: Critically analyze data from research; incorporate it into assigned writing clearly, concisely, and logically; and attribute the source with proper citation.

CO7: Practice the unique qualities of professional rhetoric and writing style, such as sentence conciseness, clarity, accuracy, honesty, avoiding wordiness or ambiguity, using direct order organization, readability, coherence and transitional devices.

CO8: Proof-read given article.

Course ZY105P Practicals in Skills in Scientific communication and writing:

After successfully completing this course, students will be able to:

CO1: Identify the grammatical mistakes from the given paragraph.

CO2: Identify common errors in written and spoken presentations.

CO3: Prepare computer assisted presentations.

CO4: Perform paraphrasing and precis writing.

CO5: Write the synonyms, antonyms and abbreviations.

CO6: Write a scientific project and research article.

CO7: Draft a hypothesis for a proposed research problem.

CO8: Use the acquired subject knowledge to enhance skills in scientific writing and communication.

Course ZY106T Fresh Water Zoology:

After successfully completing this course, students will be able to:

CO1: Enlist the diagnostic features of shrimps.

CO2: Explain the types of aquatic habitats.

CO3: Discuss the aquatic adaptations of common freshwater forms.

CO4: Explain the adaptations in freshwater Turtles and Crocodiles.

CO5: Illustrate the physicochemical properties of water.

CO6: Demonstrate the effect of pollutants on freshwater bodies

CO7: Justify the presence of zooplanktons and aquatics forms in freshwater bodies.

Course ZY106 P Practicals in Fresh Water Zoology:

After successfully completing this course, students will be able to:

CO1: Identify commercially important freshwater fish.

CO2: Identify the aquatic adaptations in common freshwater forms.

CO3: Prepare the culture of *Paramecium* and *Daphnia.*

CO4: Estimate the hardness and chloride content in water samples.

CO5: Analyze the Zooplanktons from local freshwater bodies.

CO6: Evaluate the bio-indicators of pollution in freshwater.

M. Sc. (Zoology) First Year, Semester II.
Course ZY 201T Biochemistry-II:

After successfully completing this course, students will be able to:

CO1: Define basic terminologies of metabolic pathways.

CO2: Explain the laws of thermodynamics, concept of free energy and ATP as currency

molecule.

CO3: Describe the Concepts and regulation of metabolism.

CO4: Discuss the oxidation of fatty acids and its significance.

CO5: Illustrate the electron transport chain and oxidative phosphorylation.

CO6: Illustrate the reactions, energetics and regulation of glycolysis, glycogen biosynthesis, TCA cycle, Purine and Pyrimidine metabolism

CO7: Write the general reactions of various metabolic pathways.

CO8: Justify the role of enzymes in metabolism

Course ZY 201P Practicals in Biochemistry-II:

After successfully completing this course, students will be able to:

CO1: Explain the principle of Colorimetry and Spectrophotometry.

CO2: Use the basic equipment in biochemistry lab.

CO3: Predict the enzyme activity by suitable method.

CO4: Demonstrate the effect of various physical and chemical factors on enzyme activity.

CO5: Estimate the concentration of cholesterol, uric acid, amino acids and starch.

CO6: Separate biomolecules by chromatographic methods.

Course ZY 202 T Molecular Biology:

After successfully completing this course, students will be able to:

CO1: Explain the DNA structure & types, topology, Physical properties; chromatin structure and organization.

CO2: Discuss genome organization.

CO3: explain the mobile DNA elements.

CO4: Explain mechanism of DNA damage and repair.

CO5: Illustrate the process of DNA replication, transcription, translation and their regulations.

CO6: Schematically represent the processes of central dogma.

CO7: Justify the post translational and post transcriptional modifications.

Course ZY 202 P Practicals in Molecular Biology:

After successfully completing this course, students will be able to:

CO1: Explain lab safety measures.

CO2: Isolate Bacterial DNA.

CO3: Isolate Liver DNA

CO4: Isolate RNA from given sample

CO5: Quantify the isolated Nucleic acids.

CO6: Perform Sterilization of lab equipment.

CO7: Resolve the isolated nucleic acids.

CO8: Analyze proteins using PAGE and SDS- PAGE.

Course ZY 203T Developmental Biology:

After successfully completing this course, students will be able to:

CO1: Define the terms in developmental biology

CO2: Explain model organism for developmental studies.

CO3: Explain the concept of fertilization.

CO4: Explain the concept of mesoderm induction and pattern formation with examples.

CO5: Describe neural competence and induction.

CO6: Explain the concept of growth and differentiation.

CO7: Illustrate the types of eggs and cleavage pattern.

CO8: Compare and contrast spermatogenesis and oogenesis.

Course ZY 203P Practicals in Developmental Biology:

After successfully completing this course, students will be able to:

CO1: Identify the developmental stages of chick embryo.

CO2: Demonstrate the filter paper ring method to mount chick embryo.

CO3: Demonstrate the imaginal disc in *Drosophila* larvae.

CO4: Prepare chick embryo mounting.

CO5: Prepare permanent slides of chick embryo whole mounts.

CO6: Sketch, label and explain the whole mounts and transverse sections of chick embryo.

CO7: Develop *Drosophila* culture.

Course ZY 204T Endocrinology:

After successfully completing this course, students will be able to:

CO1: Discuss the roles of Pituitary gland and pineal body.

CO2: Explain hormonal regulation of biomolecules and mineral metabolism.

CO3: Describe the role of osmoregulatory and gastrointestinal hormones.

CO4: Explain the role of hormones in moulting, change in body colour of crustaceans; yolk synthesis in amphibians; insect development.

CO5: Illustrate the mechanism of hormone action and role of hormone receptors.

CO6: Justify hormones as coordination molecules

Course ZY 204P Practicals in Endocrinology:

After successfully completing this course, students will be able to:

CO1: Identify the permanent histological slides of endocrine organs.

CO2: Explain the principle and significance of gonadectomy, pancreactomy, adrenalectomy and thyroidectomy in mouse.

CO3: Sketch the microscopic structure of endocrine glands.

CO4: Stage fish chromatophores under the influence of adrenaline and acetylcholine.

CO5: Demonstrate the role of eye stalk in sugar level in crab.

CO6: Demonstrate the retro cerebral complex in cockroach.

CO7: Demonstrate the role of insulin in sugar level of blood and glycogen.

Course ZY205T Comparative Animal Physiology:

After successfully completing this course, students will be able to:

CO1: Explain the physiology of processes like digestion, respiration, muscle contraction and excretion.

CO2: Describe the mechanism of thermoregulation in both poikilotherms and homeotherms.

CO3: Explain the mechanism of chemical communication in vertebrates.

CO4: Comment on the structure and functions of various sense organs.

CO5: Illustrate the concept of osmotic regulation in various animals with suitable examples.

CO6: Compare the physiology of regulatory mechanisms in various groups of animals

Course ZY205 P Practicals in Comparative Animal Physiology:

After successfully completing this course, students will be able to:

CO1: Identify the nitrogenous waste products of animals

CO2: Demonstrate the RBCs of common vertebrates and effect of various osmolarities.

CO3: Demonstrate the effect of body size, oxygen consumption and Insulin on aquatic animal.

CO4: Demonstrate the capillary circulation in tail fin of fish,

CO5: Demonstrate the effect of load on muscle contraction and effect of eye stalk ablation on chloride and glucose in haemolymph of crab.

CO6: Estimate the sugar, lactate and chloride content of the given organism.

Course ZY 206 T Biochemical techniques:

After successfully completing this course, students will be able to:

CO1: Explain the importance and applications of techniques in biochemistry.

CO2: Explain the principle and applications of various chromatographic techniques with examples.

CO3: Explain the principle, working, materials used and applications of electrophoresis.

CO4: Describe the concept of light, electromagnetic spectrum and its application in absorption spectroscopy.

CO5: Illustrate the importance of radioactive compounds and radioactivity in biology.

CO6: Demonstrate the principle and working of Warburg's apparatus.

CO7: Demonstrate the principle, working, applications of centrifugation.

CO8: Justify the applications of radioactivity compounds in biology.

Course ZY 206 P Practicals in Biochemical techniques:

After successfully completing this course, students will be able to:

CO1: Use proper laboratory safety protocols.

CO2: Demonstrate technical skills of fundamental biochemical laboratory

experimentation.

CO3: Investigate % retention and % elution of amino acids on given ion exchanger.

CO4: Analyze given protein by electrophoretic methods.

CO5: Analyze DNA and Protein sequences by BLAST and FASTA

CO6: Purify enzyme by salting out and organic solvent precipitation methods.

CO7: Compare the effect of different solvents on dye separation by TLC.

CO8: Compare colorimetric and spectrophotometric methods for protein estimation.

M. Sc. (Zoology) Second Year, Semester III.

Course ZY 301T Animal Physiology I (special):

After successfully completing this course, students will be able to:

CO1: Explain the membrane physiology and its dynamics.

CO2: Discuss the concepts of metabolism and metabolic rate in context of animals from various habitats.

CO3: Describe the excretory system, nitrogenous wastes and renal regulation.

CO4: Illustrate bioluminescence and animal electricity with examples and its significance.

CO5: Illustrate the osmoregulatory mechanism in Invertebrates and Vertebrates.

CO6: Correlate the organisms Internal and external environments with homeostasis and biological clocks.

CO7: Justify energy utilization in physiological and metabolic activities.

Course ZY 301P Practicals in Animal Physiology I (special):

After successfully completing this course, students will be able to:

CO1: Demonstrate the effect of body size and salinity on oxygen consumption in given animal.

CO2: Demonstrate the effect of temperature changes on water loss in cockroach.

CO3: Demonstrate the effect of starvation on liver and muscle glycogen in given animal.

CO4: Detect the normal and abnormal constituents in human urine.

CO5: Demonstrate the glomerular filtration rate by creatinine clearance.

CO6: Find the absorption spectra of blood pigment.

CO7: Induce heat shock puff in giant chromosome.

CO8: Estimate serum uric acid from given sample.

Course ZY 302T Immunology

After successfully completing this course, students will be able to:

CO1: List the primary and secondary immune organs.

CO2: Explain the concepts of immunity, self-nonself immune response, autoimmune disease.

CO3: Explain the theories of antibody synthesis and generation of antibody diversity.

CO4: Explain the principle and application of the common techniques used in Immunology.

CO5: Illustrate the events and dynamics of inflammation

CO6: Compare the MHC molecules and diseases associated with HLA.

CO7: Differentiate between active and passive immunization.

CO8: Compare the three pathways of complement fixation pathway.

Course ZY 302P Practicals in Immunology

After successfully completing this course, students will be able to:

CO1: Identify the pattern of identity of antigen- antibody reaction.

CO2: Identify the microscopic structure of the lymphoid organs.

CO3: Demonstrate immunoelectrophoresis technique.

CO4: Demonstrate the double diffusion techniques.

CO5: Detect the human blood groups by antigen -antibody reactions.

CO6: Prepare the human blood smear to identify various blood cells.

Course ZY 303T Aquaculture:

After successfully completing this course, students will be able to:

CO1: Identify the fish diseases and the causative organisms.

CO2: Mention the various composite fish culture with significance of each type.

CO3: Describe the methods of freshwater prawn culture and its management.

CO4: Explain the methods of pearl culture and pearl harvesting.

CO5: Illustrate the preparation and management of fish culture ponds.

CO6: Demonstrate the methods of packaging and transport of fish and brood fish.

CO7: Illustrate techniques of fish harvesting, preservation & processing.

CO8: Compare the techniques used in fishery development.

Course ZY 303P Practicals in Aquaculture:

After successfully completing this course, students will be able to:

CO1: Identify Indian oysters.

CO2: Identify the common freahwater fish used in culture farming.

CO3: Demonstrate the processing and storing methods for fish and prawn.

CO4: Test the freshness of fish/prawn by histological methods

CO5: Test the freshness of fish/prawn by biochemical methods.

CO6: Prepare the culture of Daphnia and rotifers

CO7: Estimate the productivity of water bodies.

Course ZY 304T Insect physiology and biochemistry:

After successfully completing this course, students will be able to:

CO1: Explain the structure, Chemistry of integument and sclerotization.

CO2: Describe the process of digestion and metabolism.

CO3: Explain the characteristics of haemolymph and types of haemocytes.

CO4: Illustrate the structure, physiology and biochemistry of flight muscle.

CO5: Demonstrate the process of excretion, detoxification and water balance.

CO6: Justify the role of insect hormones in physiological processes.

Course ZY 304P Practicals in Insect physiology and biochemistry:

After successfully completing this course, students will be able to:

CO1: Demonstrate the heart and haemocytes of cockroach.

CO2: Demonstrate the effect of starvation on glycogen in insects.

CO3: Demonstrate the effect of temperature on water loss in cockroach.

CO4: Detect the amino acids in insect haemolymph by chromatographic method.

CO5: Determine the oxygen consumption in dragon fly nymph.

CO:6: Perform the assay of amylase activity in midgut of insect.

Course ZY 305 P Practicals in Research methodology:

After successfully completing this course, students will be able to:

CO1: Use MS excel in presentation and analysis of data using common statistical tests.

CO2: Suggest a suitable title for a research article.

CO3: Write the abstract, key words, result, discussion, conclusion and citations of references.

CO4: Write a research project to seek funding.

CO5: Conduct a scientific survey.

CO6: Perform protein purification experiment.

Course ZY 307T Fundamentals of Systematics

After successfully completing this course, students will be able to:

CO1; Explain principles, methods of biological classification and dicersity in kingdom Animalia.

CO2: Explain the importance of taxonomic keys and taxonomic characters.

CO3: Explain the principles of zoological classification and nomenclature

CO4: Discuss the various taxonomic procedures and molecular phylogenetics & phylogeography.

CO5: Illustrate the methodologies used in systematics.

CO6: Differentiate between Species, subspecies, sibling species race and deme.

CO7: Justify the inclusion of a given organism in a given phylum.

Course ZY 307P Practicals in Fundamentals of Systematics

After successfully completing this course, students will be able to:

CO1: Identify museum specimen/pictures of minor phyla, Invertebrates, Protochordates and Vertebrates.

CO2: Identify animals with the help of taxonomic keys.

CO3: Collect and preserve animal samples using common methods.

CO4: Write scientific report of field/ institutional visit.

CO5: Categorize animals according to the phylogeny.

CO6: Compare the methods of collection and curation of insects.

Course ZY 308 P Research Project:

After successfully completing this course, students will be able to:

CO1: Identify and reflect on where further training or skill acquisition is necessary for self-improvement

CO2: Develop professional work habits, including those necessary for effective collaboration and cooperation with other students, instructors, and Service.

CO3: Write effective scientific and technical communication based on the project

CO4: Report research clearly, concisely, logically, and ethically;

CO5: Represent interpretations of research data within scientific and technical communities.

CO6: Prepare research proposal to seek financial aid.

M. Sc. (Zoology) Second Year, Semester IV.

Course ZY 401T Animal Physiology II (special):

After successfully completing this course, students will be able to:

CO1: Explain the concept of nutrition and digestion.

CO2: Explain the composition of blood, types of blood cells, vascular dynamics and clotting

mechanism.

CO3: Discuss the neuronal physiology and various potentials.

CO4: Explain the structure, contraction and types of contraction of muscle.

CO5: Illustrate the anatomy and physiology of heart and cardiac cycle.

CO 6: Diagrammatically represent the mechanism of respiration, gas exchange and transport of O_2 and CO_2

CO7: Justify the location and structure of eye, ear and taste buds to their functions.

Course ZY 401P Practicals in Animal Physiology II (special):

After successfully completing this course, students will be able to:

CO1: Demonstrate the effect of exercise on breathing, pulse rate and blood lactate level.

CO2: Determine the bleeding and clotting time of human blood.

CO3: Demonstrate the invertebrate heart.

CO4: Demonstrate the effect of pH, temperature and inhibitors on salivary amylase.

CO5: Map the taste buds on human tongue.

CO6: Calculate the heartbeats of Daphnia/*Drosophila* larva.

CO7: Determine serum urea and protein and glucose in human blood and urine.

CO8: Justify the effects of various physical and chemical factors on frog heart and muscle.

Course ZY 402 T Economic Zoology:

After successfully completing this course, students will be able to:

CO1: Explain coral reef and its significance.

CO2: Explain parasitic roundworms of animal and plants.

CO3: Explain the role of insects of economic importance.

CO4: Illustrate the lac culture, apiculture, prawn culture, vermiculture, Poultry, dairy industry and Piggery.

CO5: Signify the role of parasitic and soil protozoan in human welfare.

CO6: Justify the use of animals in pharmaceutical research.

Course ZY 402 P Practicals in Economic Zoology:

After successfully completing this course, students will be able to:

CO1: Identify the poultry breeds

CO2: Identify edible freshwater fish from nearby area.

CO3: Demonstrate the apiculture equipment.

CO4: Demonstrate the methods of prawn culture.

CO5: Compare various fishing tools, crafts and gears.

CO6: Design animal farm.

Course ZY 403T Mammalian Reproductive physiology:

After successfully completing this course, students will be able to:

CO1: Explain the male and female reproductive systems and sexual dimorphic characteristics.

CO2: Explain the sexual cycles with examples.

CO3: Illustrate the reproductive dysfunctions.

CO4: Diagrammatically represent the hormonal regulation of reproductive processes like pregnancy, lactation and parturition.

CO5: Prepare the flow chart to demonstrate the hormonal coordination of reproductive processes.

CO6: Justify the artificial control of reproduction.

Course ZY 403P Practicals in Mammalian Reproductive physiology:

After successfully completing this course, students will be able to:

CO1: Identify the histological slides of reproductive organ/tissues.

CO2: Explain the various types of placenta in mammals.

CO3: Comment on merits and demerits of contraceptive devices/methods.

CO4: Illustrate the technique of gonadectomy.

CO5: Perform vaginal smear technique to identify the phases of oestrous cycle.

CO6: Distinguish the male and female anatomical features of reproductive system in mammals.

Course ZY 404T Histology and Histochemistry:

After successfully completing this course, students will be able to:

CO1: Explain the fundamental tissues in details.

CO2: Describe the process of histological preparations.

CO3: Illustrate the tools used in histological preparations.

CO4: Justify the use of various stains and dyes used in histochemical detection of biomolecules.

CO5: Justify the importance of Immunohistochemistry.

CO5: Draw the structures of various tissues and label them.

Course ZY 404P Practicals in Histology and Histochemistry:

After successfully completing this course, students will be able to:

CO1: Identify the various tissues with the help of permanent slides.

CO2: Demonstrate the effect of fixatives on tissues.

CO3: Detect the biomolecules with histochemical staining methods.

CO4: Sketch and label the microscopic details of tissues.

CO5: Prepare the permanent histological slides.

Course ZY 405T Pollution biology:

After successfully completing this course, students will be able to:

CO1: Explain the organization of biosphere.

CO2: Explain in details the types of pollution.

CO3: Describe the pollution monitoring strategies.

CO4: Illustrate the bioassay methods.

CO5: Elucidate the methods to study the impact of pollutants.

CO6: Justify the importance of biomedical waste management.

Course ZY 405P Practicals in Pollution biology:

After successfully completing this course, students will be able to:

CO1: Identify the bioindicators from given water sample.

CO2: Write a report on eutrophication of water body.

CO3: Determine the LC_{50} value for the given compound.

CO4: Determine the biomass of given sample.

CO5: Analyze pH and salinity of given sample.

CO6: Estimate calcium and magnesium, sulphate from polluted water.

Course ZY 406T Apiculture:

After successfully completing this course, students will be able to:

CO1: Explain the basic concepts of apiculture like systematics, colony organization, polymorphism, morphology and foraging.

CO2: Explain the tools and management of apiary.

CO3: Explain the importance of institutions pertinent to apiculture.

CO4: Discuss the setup of beekeeping business.

CO5: Illustrate the bee keeping as occupation.

CO6: Justify the presence of bees to increase the agriculture productivity.

Course ZY 308 P Research Project:

After successfully completing this course, students will be able to:

CO1: Explain the importance of material and methods used in research

CO2: Illustrate the research work.

CO3: Write effective scientific and technical communication based on the project

CO4: Design experimentation to prove the hypothesis

CO5: Represent interpretations of research data within scientific and technical communities.

M. Phil. (Zoology) Programme

Programme Outcomes:

After successfully completing M**. Phil. (Zoology)** Programme students will be able to:

PO1. Demonstrate critical understanding, at an advanced level, of up-to-date knowledge and research methodology of a particular field.

PO2. Implement effective academic and personal strategies for carrying out research projects independently and ethically.

PO3. Contribute to original knowledge through the research work in response to issues in their specialization area.

PO4. Communicate research findings at a diverse range of levels and through a variety of media

PO5. Evaluate one's own research in relation to its implications in the important and latest issues in the field.

PO6: Access the primary literature, identify relevant works for a particular topic, and evaluate the scientific content of these works.

PO7: Integrate related topics from separate parts of the course such as levels of organization, cell biology, ecology, evolution, biochemistry, genetics, embryology, basic biotechnology, physiology and molecular biology.

PO8: Apply statistical tests to analyze the data obtained from the experimentation /survey.

PO9: Publish the findings in scientific journal, conference proceedings and presentations.

PO10: Write thesis in a standard scientific format using the current norms of scientific writings.

Programme Specific Outcomes

After successfully completing M.**Phil. (Zoology)** Programme students will be able to:

PSO1. Identify, define and apply the core knowledge related to their research topic.

PSO2. Extend disciplinary knowledge and of a relevant secondary area

PSO3. Demonstrate a systematic understanding of relevant knowledge within the scope of their biological research project.

PSO4. Extract relevant knowledge from available resources and demonstrate progress toward assessing quality and validity.

Course Outcomes

Course: Paper I Research Methodology:

After successfully completing this course, students will be able to:

CO1: Use computers in data representation and analysis

CO2: Describe widely accepted methodologies relevant to the subject.

CO3: Explain the principle and working of general laboratory equipment required for research in zoology.

CO4: Explain the method of thesis writing and importance of each aspect of it.

CO5: Write a scientific article.

CO6: Publish the results obtained from the experimental work.

CO7: Compare the different methods used for a specific reason of biological science.

CO8: Design an experiment and standardize it for further use.

Course: Paper II Recent Advances in Zoology:

After successfully completing this course, students will be able to:

CO1: Explain the molecular basis of life, Gene expression and regulation.

CO2: Describe the factors and processes required to offer the state of protection against any infections.

CO3: Explain the concept of autoimmunity.

CO4: Describe the ultrastructure of various cells and organelles.

CO5: Comment on the functions of cells and organelles.

CO6: Demonstrate the techniques used in genetic engineering.

CO7: Illustrate the chemical bonds, structure and biological significance of biomolecules.

CO8: Illustrate the cell culture methods and their significance.

CO9: Relate the abnormalities in cell functioning to the diseases /disorders.

Course: Paper III Insect Pest Control and Toxicology (Optional):

After successfully completing this course, students will be able to:

CO1: Define pest and types of pest with examples.

CO2: Identify the common pest of agriculture, medical and veterinary importance.

CO3: Explain the economics of pest control.

CO4: Explain the toxicology of insecticides.

CO5: Comment on the various bioassays used to find the toxicity of a given compound.

CO6: Illustrate the various types of control strategies.

CO7: Integrate the statistical knowledge to find the effectiveness of a given toxicant.

Course: Paper III Limnology (Optional):

After successfully completing this course, students will be able to:

CO1: Define various water bodies.

CO2: Identify the major carps of India.

CO3: List the water pollutants.

CO4: Explain the toxic effects of pollutants.

CO5: Compare the lentic and lotic environments

CO6: Categorize pathogens associated with water borne diseases.

CO7: Justify the need of freshwater fisheries in India.

Course: Paper III Physiology of Mammalian reproduction (Optional):

After successfully completing this course, students will be able to:

CO1: Define terms in reproductive physiology.

CO2: Identify the reproductive phases.

CO3: List the various hormones of reproductive processes.

CO4: Explain the reproductive systems.

CO5: Compare the effects of male and female sex hormones.

CO6: Categorize the reproductive technologies with their significance.

CO7: Justify the role of hormones in reproductive physiology.

Ph.D (Zoology) Programme

Programme Outcomes:

After successfully completing Ph.D**. (Zoology)** Programme students will be able to:

PO1. Explain the kinds of data generated by various workers in the field of biological research.

PO2. Access the primary literature, identify relevant works for a particular topic in life

science, and evaluate the scientific content of these works.

PO3. Explain contemporary issues in biological sciences relevant to the area of specialization.

PO4. Exercise critical judgement, independent thinking and problem solving through the research work undertaken. .

PO5. Demonstrate critical and creative thinking, with an aptitude for continued self-directed learning.

PO6: Write scientific reports and communicate results in oral presentations; and time management and self-management skills.

PO7: Apply multidisciplinary fundamentals of statistical tools and physical principles (physics, chemistry) to the analysis of relevant biological situations.

PO8: Possess an ability to identify, formulate, and solve biological problems to contribute to service efforts to community in both the professional and private realm.

PO9: Publish the findings in scientific journal, conference proceedings and presentations.

PO10: Write thesis in a standard scientific format using the current norms of scientific writings.

Programme Specific Outcomes

After successfully completing Ph.D**. (Zoology)** Programme students will be able to:

PSO1. Develop analytical and integrative biological and environmental problem-solving approaches.

PSO2. Quantitatively analyse the biological data.

PSO3. Explain theoretical and practical approaches of handling animals used as models in zoological experimentations.

PSO4. Apply statistical tests to analyse the data obtained from the experimentation /survey.

PSO5. Demonstrate proficiency in writing and speaking about biological concepts and research.

PSO6. Collect, record and analyse data using appropriate ecological, genetic and behavioural techniques in the field and laboratory.

Course Outcomes

Course I- Research Methodology:

After successfully completing this course, students will be able to:

CO1: Define research problem.

CO2: Review literature relevant to the topic.

CO3: Use concepts and tests in biostatistics for data analysis.

CO4: Explain the basics of bioinformatics and concept of biological databases and their applications.

CO5: Explain the principle, working and applications of biochemical and biophysical techniques.

CO6: Illustrate the various separation techniques for biomolecules.

CO7: Discuss the methods of histology and histochemistry.

CO8: Justify the methodologies used in biological research.

CO9: Design experimentation relevant to the topic of research.

Course 2- Advances in Biology I & II:

After successfully completing this course, students will be able to:

CO1: Explain the various sampling techniques.

CO2: Explain the molecular and computational tools in phylogeny.

CO3: Explain the concepts in IPR.

CO4: Discuss the concepts of biodiversity and taxonomy.

CO5: Demonstrate the fundamentals of genomics and proteomics and their applications.

CO6: Discuss the ethical norms required for a Zoology lab.

CO7: Comment on simulations and modelling.

CO8: Illustrate the recent techniques like DNA bar coding and concepts in molecular

phylogeny.

CO9: Assess the biodiversity by undertaking a case study.

CO10: Compare the patterns of animal behavior.

Course 3- Field work, Seminars and other academic activities:

After successfully completing this course, students will be able to:

CO1: Apply ecological methods in field survey and study.

CO2: Individually conduct field trials and experiments.

CO3: Write research proposal to seek funding.

CO4: Compose a research article.

CO5: Present the findings of the research using ICT tools.

CO6: Conduct surveys for the field work.

CO7: Integrate various collection methods on field.

CO8: Design a practical for postgraduates and undergraduates.