Department of Zoology

PO (B.Sc. UG)

PO1. Environment protection and conservation - To gain basic knowledge about environment conservation, environment protection and environment improvement. Also to motivate them for the welfare of human and non-human communities.

PO2. To strengthen their communicative skills - To create interest among students in the field of zoology through different methods including power point presentation, group discussions, seminars.

PO3. Environment Sensitivity and sustainability - To sensitize towards environment and sustainability and significance of sustainable development.

PO4. Skills for understanding and learning - To escalate their skills for understanding and learning about some of the economic uses of various fauna through project work and educational tours.

PO5. To develop natural ability in the field of life science, which proves beneficial in the field of research for society.

PO6. To enhance the Knowledge in the field of modern tools and techniques and their practical use in the laboratory.

PO7. Social Interaction: Ability to elicit views of others, to demonstrate empathetic social concern and equity-centered national development, mediate disagreements and help to reach conclusions in group settings.

PO8. To develop communication skill due to continue exposure given to them, which proves a boon for their future.

PO9. Ethics: Recognize different value systems, understand the moral dimensions of one's decisions, and accept responsibility for them.

PO10. Effective Social Interaction: Elicit views of others, mediate disagreements and help reach conclusions in group settings. Able to explore and generate employment to other sections of the society.

PROGRAMME SPECIFIC OUTCOMES (PSO)

PSO1. To understand and capable to learn in the major field of classification, characteristics of Invertebrate and vertebrate animals, embryology, biochemistry, biotechnology.

PSO2. To develop capacity and to explore themselves in the field of Zoology and related subjects like Biotechnology, Biochemistry, Life-Sciences which proves beneficial in the field.

PSO3. To understand the concepts and principles of biochemistry, immunology, physiology, ethology, evolution, and environmental biology endocrinology, developmental biology, cell biology, genetics, and entomology, molecular biology, and microbiology.

PSO4. To develop technical skills in biotechnology, bioinformatics, and biostatistics.

PSO5. To develop and impart their knowledge in the field of Applied Zoology: Sericulture, Aquaculture, Poultry Farming, fish farming, Animal husbandry.

PSO6. To Perform laboratory procedures in the areas of animal diversity, systematics, cell biology, genetics, biochemistry, immunology, developmental biology, environmental biology, science methodology.

PSO7. Identify and Classify common animals found in the nearby area, Procedure, and preservation of collections.

PSO8. Use of tools which are commonly used in the labs and are useful for all activities related to Zoology.

PSO9. To impart a good relationship with the nature and to protect the nature.

PSO10. To ensure that the students are equipped with expertise to make use of the opportunities and to tackle the challenges in the field of Zoology.

B.Sc Part I

Course Outcomes

Subject- Zoology

Paper name- CELL BIOLOGY AND NON-CHORDATA

CO-1 - Understand the whole-cell organelles with their structure and function.

CO-2 - Understand the cell cycle and the imCOrtance of various cells in the body of organisms.

CO-3 - Understand the cellular comCOnents underlying cell division and learn about various cell division phases.

CO-4 - Obtain knowledge of the structures and functions of basic comCOnents of prokaryotic and eukaryotic cells, especially macromolecules, membranes, and organelles.

CO-5 - Students learn the origin of multicellular organisms from unicellular eukaryotes andthe concept and diversity of Non-Chordata.

CO-6 - Students learn how organisms are classified based on Non-Chordata on their complexity, organization and characters.

CO-7 - Students learn about specific features for any group of organisms in non-chordates and their identification

CO-8 - Understand the concept of metamorphosis, canal system, pathogenic protozoa etc.

CO-9 - Students learn about the characters and classification of Phylum Platyhelminthes, Nemathelminthes, Annelida and ArthroCOda up to order level.

CO-10 - Learn about the general characters and classification of Phylum Mollusca and Echinodermata.

Subject- Zoology

Paper name- CHORDATA AND EMBRYOLOGY

CO-01 - Students understand the classification, structure, function and biology of chordates of different taxonomic classes.

CO-02–Students learn special topics like poisonous snakes and non-poisonous snakes, migration of birds, and parental care in fish.

CO-03–Understand various adaptations in the avian group for flight and migration.

CO-04 - Students learn about the classification of mammals - Prototheria, Metatheria, Eutheria and Affinities.

CO-05 - Students learn about the process of gametogenesis, structure of gamete,types of eggs and patterns of cleavage.

CO-06 - Explained frog development up to the formation of three germ layers and parthenogenesis.

CO-07 - Students were explained about induction, differentiation and regeneration.

CO-08 – Explained the structure and function of Extra-embryonic membranesand different types of the placenta in mammals.

Practical Course

Programme - B.Sc. Part- II
Course Outcomes
Subject- Zoology
Paper name- Anatomy and Physiology

CO-01-Students will have understood the structures of different systems such as integumentary, skeletal, digestive, respiratory, circulatory, urinogenital, nervous and sensory organs in a comparative way among the vertebrate groups.

CO-02- Students were taught about respiratory organs, gill, lungs, and air sacs in birds.

CO-03- Understand the endoskeleton system with the help of models.

CO-04- Students were taught about the structure and function of organs like the ear, eye and gonads.

CO-05- Students were taught the detailed concepts of digestion, respiration, excretion the functioning of nerves and muscles.

CO-06- Understand the physiology of digestion, muscles, nerves, reproductive systems, respiration and excretion.

Programme - B.Sc. Part- II
Course Outcomes
Subject- Zoology

Paper name- Vertebrate Endocrinology, Reproductive Biology, behaviour, Evolutionary and applied zoology

CO-01- Structure, function biosynthesis and secretion of endocrine glands.

CO-02- Understand the various types of the reproductive cycle and hormonal regulations.

CO-03- Understand the different reproductive cycles and various patterns of reproductive behaviours.

CO-04- Explained the concept of the origin of life and theories of organic evolution.

CO-05- Understand evidence of organic evolution as well as the evolution of horses.

CO-06- Introduce the term apiculture, aquaculture, sericulture and pisciculture and provides the details of methods and the economic importance of api, aqua, seri, pisci culture.

CO-07- To understand the methods of chemical and biological control of pests.

practical Course

CO-01-Dissection of various systems of scoliodon to demonstrate afferent and efferent branchial cranial nerve and internal ear.

CO-02- Anatomical structure of various organs was taught through stained and unstained slides.

CO-03- Students understood the honey bee's species identification and life cycle.

CO-04-Learn the comparative study of limb girdles and vertebrates of frog, Varanus, fowl and rabbit.

Programme - B.Sc. Part- III
Course Outcomes
Subject- Zoology

Paper name- Ecology, Environmental Biology: Toxicology, Microbiology & Medical Zoology

CO-01- Students learnthe aims and scope of ecology, major ecosystem and their characteristics.

CO-02- Understand the characteristics of populations and different Bio-geo chemical cycles.

CO-03- Understand the ecosystem's energy flow and the importance ofthe food chain and food web in ecosystems.

CO-04-Gain knowledge about the natural resources and their conservation method.

CO-05- Students learn about various environmental and heavy metal toxicants and the principles of toxicology.

CO-06- Understand the general idea about microbiology and its application in dairy production,

sewage treatment and various other industrial application.

CO-07- Brief introduction about the various pathogenic organism, their life history and pathogenicity.

Programme - B.Sc. Part- III

Course Outcomes

Subject- Zoology

Paper name- Genetics, Cell physiology, Biochemistry, Biotechnology And Biotechniques

CO-01- Define the basic terms in genetics and understand Mendelian and Non-Mendelian genetics.

CO-02-Discuss the linkage groups and gene frequency,the concept of mutation.

CO-03-Imparts knowledge about the mutation, chromosomal aberrations, and single-gene disorders.

CO-04-General idea about the basic cell physiology, pH, and transport across the cell membrane.

CO-05-Students will understand the metabolism of carbohydrates, lipids and proteins in detail.

CO-06-Learn about oxidative phosphorylation and redox reactions.

CO-07-Enhance understanding of the various aspects and applications of biotechnology as well as the importance of bio-safety and ethical issues related to it.

CO-08- Imparts the Knowledge to culture animal cells in artificial media, use in recombinant DNA technology, genetic manipulations and in a variety of industrial processes

CO-09-The basic idea about the principle and application of various biotechniques like pH meter, calorimeter,

CO-10-Imparts knowledge about the different types of microscopic techniques and separation techniques by chromatography and electrophoresis.

Practical Course

CO-01- Learn the estimation methods of population density, percentage frequency, and relative density.
CO-02- Understand the Blood grouping, RBC and WBC counting methods.
CO-03- Idea about the various chromatography separation techniques
CO-04- Study of different phases of the cell cycle in onion root tip using squash methods.
CO-05- Biochemical detection of carbohydrate, protein and lipids.
CO-06- Demonstration of working principles of pHmeter, microscopy, centrifuge.

Department of Zoology

M.Sc. PO (PG)

PO-1. Apply the knowledge of Zoology, Life Sciences and allied subjects to the understanding of complex life processes and phenomena.

PO-2. Understanding the evolutionary processes through origin of life from acellular animal (Protozoa) to multicellular organisms (from dinosaur to humans), history of phylum etc. Identify, review research literature, and analyses complex situations of living forms.

PO-3.Design processes/strategies that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO-4. 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 in real situations.

PO-5. Demonstrate, solve and an understanding of major concept of all physiological activities in various disciplines of Zoology such as Entomology (study of insects) Ichthyology (detailed study of fishes including their habit and habitat) Ornithology (study of birds including migration of birds which fascinates the students).

PO-6. To inculcate the scientific temperament in the students and people outside the scientific community through field visits for better understanding of the industrial processing, biodiversity, bird watch etc.

PO-7. Create an awareness of the impact of Zoology on the environment, society, and development outside the scientific community.

PO-8. To study the ecological phenomenon from ecosystem to protection of endangered species by in-situ and ex-situ conservation. The process of survival in different environment via adaptation. Knows the concept, process, physiology, and molecular basis of animal development. Identify a range of invertebrates and vertebrates and justify their conservation.

PO-9. Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the work/research practice.

PROGRAMME SPECIFIC OUTCOMES (PSO)

PSO1. To Gain Knowledge in the field of taxonomy and procedure of nomenclature, which is the basic requirement for classification of different organisms due to diversity among them.

PSO2. To understand the latest and fast-growing field of population genetics, immunology, neuroendocrinology, circadian rhythms among animals.

PSO3. To know about the morphology, anatomy and physiology of different class of animals and therefore, encouraged them to become skilled through various models.

PSO4. To get Knowledge regarding environment degradation and take initiatives to protect environment, through various activities like campaigning, posters, so as to create awareness among other sections of the society also.

PSO5. To get Knowledge in the specialized area of Reproductive biology and Fish & Fisheries the post graduate students of zoology can generate employment.

PSO6. To know about conservation of fauna, protection, management and improvement of environment and utilizes it safely towards the environmental issues and development.

PSO7. To develop natural ability of learning not only in the field of zoology but also related subjects of life-science, like Biotechnology, Microbiology, and Biochemistry which proves beneficial in the field of research for society.

PSO8. To develop laboratory skill in Identification of animals, Fish and Fisheries, Animal behaviour, Environmental pollution which are also beneficial for higher education and employment.

PSO9. To gains an adequate knowledge about various techniques of biological assays, like spectroscopy, Microtome, electrophoresis, spectrophotometer, ultracentrifugation, cell culture etc.

PSO10. To develop communication skill due to continue exposure given to them by the department of zoology through various projects which proves a boon for their future.

Semester-I COURSE OUTCOMES

NAME OF PAPER

Paper I BIOSYSTEMATICS & TAXANOMY BIODIVERSITY

Paper II STRUCTURE & FUNCTIONS OF INVERTEBRATES

Paper III GENERAL AND COMPARATIVE ENDROCRINOLOGY OF VERTEBRATES

Paper III GAMETE BIOLOGY AND REPRODUCTUVE PHYSIOLOGY IN HUMAN BEINGS

LAB COURSE -I

LAB COURSE-II

PAPER I BIOSYSTEMATICS && TAXANOMY BIODIVERSITY

CO–1. To understand the Basic concepts of Biosystematics and taxonomy

CO–2. Study the Dimensions of speciation and specific characters.

CO–3. Study the Procedure keys in taxonomy.

CO–4. Study of biodiversity, climatic change hot spots.

PAPER II STRUCTURE & FUNCTIONS OF INVERTEBRATES

CO–1. Study of organization of coelom, Locomotion.

CO–2. Understand the Physiology of Nutrition, digestion, and respiration

CO–3. To gain knowledge about the Excretion and Nervous system.

CO–4. Get the knowledge of Concept and significance of Minor phyla and various larval forms in invertebrates.

Paper III GENERAL AND COMPARATIVE ENDROCRINOLOGY OF VERTEBRATES

CO–1. Understand the concept of hormones and signal transduction.

CO–2. To know about the signalling pathways in human beings.

CO–3. To understand about endocrinology and Biosynthesis of hormones

CO–4. Get the knowledge about the hormones mediated behaviours and hormonal disorders.

Paper III GAMETE BIOLOGY AND REPRODUCTUVE PHYSIOLOGY IN HUMAN BEINGS

CO–1. Understand the basic knowledge of Oogenesis, vitellogenesis and spermatogenesis.

CO–2. Understand the Biological and biochemical role of Fertilization.

CO–3. Study about the male and female reproductive systems and endocrine function in male.

CO–4. To know about Differentiation, Metamorphosis, and teratology.

LAB COURSE I

1. Study of biodiversity of vertebrates and invertebrates.
2. Students will study about the insect diversity.
3. To gain knowledge regarding invertebrates through museum specimens.
4. Observation of permanent slides of invertebrates.
5. Biodiversity in grassland, preservation methods in different invertebrates.

LAB COURSE II

1. To study the various glands of vertebrates and insects,

2. Microscopic structure of various glands.

3. Students will know about the histological techniques.

SEMESTER-II COURSE OUTCOMES

Paper I MOLECULAR BIOLOGY AND BIOTECHNOLOGY

Paper II TOOLS AND TECHNIQUES IN BIOLOGY

Paper III QUANTITATIVE BIOLOGY AND COMPUTER APPLICATION

PAPER IV IMMUNOLOGY AND DEVELOPMENT BIOLOGY

PAPER I

MOLECULAR CELL BIOLOGY AND BIOTECHNOLOGY

CO1-To understand the structural organisation of cells.

CO–2. To study the cilia and flagella.

CO–3. To understand about the process of detailed mechanism of translation and transcriptions.

CO-4 To get the Knowledge of application of biotechnology in various sectors.

PAPER II TOOLS AND TECHNIQUES IN BIOLOGY

CO–1. To understand the Importance and application of Biological and chemical assay studies

CO–2. Study the Microscopy principles of light transmission and functioning.

CO-3. Study the Various Microbiological techniques and tissue culture.

CO–4. To understand the principals and techniques of Nucleic acid Hybridization, cryopreservation, separation of DNA etc.

PAPER-III QUANTITATIVE BIOLOGY AND COMPUTER APPLICATION

CO–1. To gain insight into Digital computerization and its application

CO–2. To study MS Office, Excel, PowerPoint.

CO-3 To Know about Organization, representation of data and central tendency.

CO–4.To understand the test of significance, correlation, Regression

Study of Central tendency, ANOVA, correlation, Probability.

PAPER IV IMMUNOLOGY AND DEVELOPMENT BIOLOGY

CO–1. To gain insight into Concept of Immune system, types of cell and organs involved in it and Monoclonal antibodies, Antigen and Antibodies interaction.

CO–2. To study about T-cells, and B-cells, Activation, maturation, and differentiation.

CO-3. Autoimmune disease, Immunization, transplantation, Vaccine development.

CO-4. To study about the developmental process of chordate.

CO-5. To gain knowledge about the gastrulation, teratology, organogenesis.

LAB COURSE I

MOLECULAR BIOLOGY AND BIOTECHNOLOGY AND TOOLS AND TECHNIQUES IN BIOLOGY

To gain knowledge of Isolation of DNA, RNA, cell biology related practical's, various separation methods.

Estimation of RBC, WBC, Blood group detection.

To understand the working principle and applications of pH meter, microscopy, chromatography, electrophoresis, and microscopy.

PAPER-III QUANTITATIVE BIOLOGY AND COMPUTER APPLICATION

CO–1. To gain insight into Digital computerization and its application

CO–2. To study MS Office, Excel, PowerPoint.

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LAB COURSE I

MOLECULAR BIOLOGY AND BIOTECHNOLOGY AND TOOLS AND TECHNIQUES IN BIOLOGY

To gain knowledge of Isolation of DNA, RNA, cell biology related practical's, various separation methods.

Estimation of RBC, WBC, Blood group detection.

To understand the working principle and applications of pH meter, microscopy, chromatography, electrophoresis, and microscopy.

LAB COURSE II

QUANTITATIVE BIOLOGY AND COMPUTER APPLICATION, IMMUNOLOGY AND DEVLOPMENTAL BIOLOGY

To Study slides of development biology and embryology.

Calculation of probability, t-test, chi-square test and regression analysis.

To study about the computer applications for data presentations, communications.

SEMESTER -III COURSE OUTCOMES

Paper I Comparative Anatomy of vertebrate

Paper II Animal Behaviour

Paper III Environmental Physiology and population Ecology

Paper IV Immunology and Parasitism

PAPER I

COMPARATIVE ANATOMY OF VERTEBRATE

CO–1. To understand the Origin, classification of Vertebrates.

CO–2. Comparative Study the Limbs, Jaws, Girdles

CO-3. Study the Heart, Arotic Arhes in different groups of vertebrates.

CO-4. Comparative Study the Brain, digestive system, sense organs in different groups of vertebrates.

PAPER II

ANIMAL BEHAVIOUR

CO–1.To Understand Histological perspective of ethology, Rhythms and its types.

CO–2. Understand the methods of learning, communication, reproductive biology etc.

CO–3. To gain knowledge about the Orientation and Neural as well as hormonal control of behaviour.

CO–4.Understand the basic knowledge of hormonal control of behavioural patterns.

PAPER III

ENVIRONMENTAL PHYSIOLOGY AND POPULATION ECOLOGY

CO–1. Understand the basic knowledge of Population dynamics, population density, and Population evolution and community dynamics.

CO–2.Understand the Types of adaptation in vertebrates- Arial. Terrestrial, Aquatic and cave.

CO–3.To get the knowledge of Stress, Physiology, acclimatization, Physiology, Mechanism of adaptation.

CO–4. To know about Stress physiology in different body conditions.

PAPER IV

POPULATION, GENETICS & EVOLUTION

CO–1. Understand the basic knowledge about Origin of life (Biotic & Abiotic concepts, Evidence of Evolution.

CO–2. Understand the Molecular evolution (varieties of genomics evolution.

CO–3 to study about pattern and organization of reproductive isolation.

CO–4.Study the Origin of Higher categories.

LAB COURSE I

COMPARATIVE ANATOMY OF VERTEBRATE AND ANIMAL BEHAVIOUR

1. To gain knowledge of museum specimens of chordate.
2. Observation of the following in the pre-dissected specimens of Vertebrates.
3. Comparative study of integuments and reproductive systems of major vertebrates.
4. Osteology of Amphibia, Reptile, Bird, and Mammal.
5. Behaviour aspects of phototactic, geotactic behaviour.
6. To study the food preference in insects.

LAB COURSE II

1. To gain knowledge about the various problems of populations genetics.
2. Study the experiments based on population genetics, pedigree analysis.
3. Understand the evolution pattern of different organisms.
4. Study about the biotic community,
5. To understand the biogeochemical cycles by way of models.

SEMESTER -IV COURSE OUTCOMES

ELECTIVE A: FISH AND FISHERIES AND AQUACULTURE

Paper I LIMINOLOGY AND ECOTOXICOLOGY

Paper II ICHTHYOLOGY

Paper III CAPTURE FISHERIES

Paper IV AQUACULTURE AND CULTURE FISHRIES

Paper I LIMINOLOGY AND ECOTOXICOLOGY

CO–1. Comprehend the physical, chemical, and biological properties of freshwater ecosystems, including lakes, rivers, and wetlands.

CO–2. Identify and classify major aquatic organisms and their roles in ecosystem functioning.

CO–3. Conduct water quality assessments using standard limnological techniques.

CO–4. Evaluate the impact of natural and anthropogenic factors on water quality.

CO–5. Perform ecotoxicological testing using various bioassays and biomarkers.

CO-6. To study the Bio magnification, Biotransformation, environment legislations.

Paper II ICHTHYOLOGY

CO–1. To study the general characteristics and classification of pieces.

CO-2. To study the embryonic development of Indian carp.

CO-3. Study of general anatomy of fish.

CO-4. Study of sense organs of fishes.

Paper III CAPTURE FISHERIES

CO-1. Study of fish as food commodity

CO-2. To study about marine fishes of India.

CO-3. Understand the ecology and of aquatic ecosystem.

CO-4. To study the effects of pollutions on water bodies.

Paper IV AQUACULTURE AND CULTURE FISHRIES

CO-1. To study about the aquaculture.

CO-2. Study of physico-chemical and biological characteristics of fish ponds

CO-3. Understand about the induced breeding in fishes.

CO-4. Study of harvesting methods of fish culture.

CO-5. Student will learn about the Fish disease and their control.

LAB COURSE I

1. To study toxicity of various toxicity chemicals.
2. Chemical analysis of pond water.
3. To study the various organs of fishes, clay modal preparation of various class of fishes, cranial nerves, accessory respiratory organs in fishes.

4. Histology and histochemical preparation of slides in fishes through microtome.

LAB COURSE II

Study of zooplankton and phytoplankton.

Study of identification of fish.

Identification of fish eggs, fry and fingerlings.

Study of histology through permanent slide of fishes.