DEPARTMENT OF ZOOLOGY

Course Outcomes

Course	Outcome
Animal Diversity-Invertebrates	➢ Students will learn about the General Characters and classification of various Invertebrate Phyla. Structure and functional biology of various animals belong to Invertebrates will be known. ➢ The basic knowledge of parasitology, vectors, host-parasite interactions is given to the students. ➢ Life cycles of various parasites are understood. ➢ Students will learn Pathology, Symptoms, diagnosis and treatment of helminth parasites.
Animal Diversity-Vertebrates	➢ Students will learn about the General Characters, Classification, structure, function and biology of Vertebrates. ➢ Parental care in Amphibia, Poisonous and non-poisonous snake's differences, Migration and Flight adaptation in Birds, Dentition and Aquatic adaptation in Mammals.
Animal Physiology and Animal Behaviour	➢ Functionality of various system of the body will be understood. ➢ Physiology of Digestion, Respiration, Circulation, Excretion, Muscles, Nerves is understood. ➢ Structure and function of Heart. Irregularities of Heart beat and blood clotting mechanism is known. ➢ Endocrinology and functions of various hormones produced in the body is understood. ➢ The knowledge of Learning and Imprinting with respect to behaviour of animals is imparted to the students. ➢ Different patterns of behaviour and cooperative behaviour is understood.
Cell Biology, Genetic and Developmental Biology	➢ Students will learn about the structure and function of various cell organelles. ➢ Transport across cell membrane will be learnt. ➢ Knowledge about genetic material-gene, chromosome is imparted to the students. ➢ Cell division and types is understood ➢ Structure of genetic material-DNA, RNA. ➢ Knowledge about replication, transcription, translation and gene regulation is given to the students. ➢ Students will learn about the fundamental of genetics, mendelian and non mendelian inheritance. ➢ Sex determination and types in different animals. ➢ Sex linked inheritance. Study of inheritance of Haemophilia, Colour blindness, Sickle cell anaemia. ➢ Hormonal and environmental influence on the sex determination of animals. ➢ Mutations in animals.

	➢ Syndromes in humans due to malfunction of cell division apparatus during cell division. ➢ Inborn errors of metabolism in humans
Immunology and Biotechnology	➢ Students will know about the structure and function of Immune cells, Natural and acquired immunity. ➢ Structure of antigens, antibodies. Function of antibodies. ➢ Antigen-antibody interactions. ➢ Hypersensitivity reactions. ➢ Immunodeficiency diseases ➢ AIDS ➢ Plasmids, Cosmids. ➢ Transgenic animals ➢ Stem cells and applications
Ecology, Zoogeography and Evolution	➢ Students will understand various features and aspects of ecology. ➢ Types of pollution and influence on health. ➢ Biogeochemical cycles. ➢ Changes in the habitat- Hydrosere, Xerosere. ➢ Distribution of animals in different continents. ➢ Different theories of Evolution, Concept of Origin of species. ➢ Evidences of Evolution. ➢ Types of speciation. ➢ Natural selection.
Project work	➢ Students will know the basics of research. Review of literature, experimental design, Analysis of the result

Program specific Outcome:

PSO1: Acquire knowledge and understand the scientific facts of natural phenomena.

PSO2: Students gain knowledge of Ecological aspects of the society and analyse the influence of pollution on human health.

PSO3: Acquire knowledge of physiology, ecology, developmental biology, evolution, genetics which can be applied for the betterment of the society.

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M.Sc. Zoology Programme outcomes and Course outcomes

Programme Outcomes

PO1: Students gain knowledge of Invertebrates and Invertebrates.
PO2: Anatomy and Physiological functions of various animals is understood by the students.
PO3: Knowledge gained by the study of cell biology, molecular biology and physiology helps to know the various metabolic activities and disorders in humans.
PO4: Students acquire knowledge of inheritance, sex determination, inborn errors of metabolism which can be applied in conducting research for human welfare.
PO5: Understands the various aspects of ecosystem and gains knowledge on pollution and prevention which helps in conservation of flora and fauna.
PO6: Knowledge of Immunology helps to understand various immune related diseases of Humans.
PO6: The course helps to integrate ecological changes with evolution and can predict the direction of evolution.
PO7: With the knowledge of systems biology, the student can do research and can find out new predictive models used for human welfare.
PO8: Synthesis and chemical nature of various hormone is understood.
PO9: Student can integrate the knowledge gained from various topics of the course that can used in securing a better place in the society.
PO10: The knowledge gained by studying the programme can be used for doing research for betterment of the society

Course Outcomes

SEMESTER-I

Paper-1 Structural Biology

CO1: Classification, Structure and function of Carbohydrates, Lipids, DNA and RNA is understood by the students.
CO2: Knowledge of enzyme functionality, metabolism, catabolism and metabolic disorders of biomolecules is gained by the students.
CO3: Students learn about the permeability, communication and signaling of cell membrane.
CO4: Concepts of Replication, Repair mechanism of DNA and Protein synthesis is imparted to the students.

Paper-II Environmental and Conservative Biology

CO1: Understand concept of Ecosystem types, Population dynamics and growth curves.
CO2: Inorganic pollution, its Impact and Eutrophication is understood.
CO3: Students gain knowledge of Biogeography regions of India & Classification of different Habitats.
CO4: Environmental impact assessment, Conservation movements in India and legislations With reference to environment is known.

Paper-III Immunology

CO1: Types of Immunity and cells involved in immunity is studied.
CO2: Antigens, Antibodies, Monoclonal antibodies and complement system is known.
CO3: Hypersensitivity and complement system is understood.
CO4: Concepts of Transplantation, Immunity to infection & Tumor immunology is gained by the students.

Paper-IV Advances in Taxonomy and Functional Anatomy of Invertebrates

CO1: Basic concepts & Types of Taxonomy and ICZN is understood.
CO2: Imparts knowledge of Invertebrates from phylum Cnidaria to Mollusca & host parasite Relationship to students.
CO3: Significance of Larval forms belonging to Crustacea and Echinodermata is learnt.
CO4: Knowledge of various minor phyla is imparted to the students.

SEMESTER – II

Paper-I Tools, Techniques and Biostatistics

CO1: Tools and techniques used in Biological research.
CO2: Techniques related to imaging of Biological molecules and separation of molecules.
CO3: Knowledge of Diagnostic techniques.
CO4: Various methods used in Biostatistics.

Paper-II Animal Physiology

CO1: Knowledge of Physiology of Digestion, Respiration & Circulation.
CO2: Students gain knowledge with regard to physiology of Osmoregulation, Kidneys and Temperature regulation.
CO3: Students understand the functional mechanisms of muscles, nerves and receptors.
CO4: Role played by Invertebrate and Vertebrate hormones is understood.

Paper-III Molecular Genetics and Developmental Biology

CO1: Concepts of Inheritance and genetic disorders is understood,
CO2: DNA technology, vectors, cloning strategies, hybridization techniques are known to the students.
CO3: Sequence of events and process related to the development of organism is known.
CO4: Development of organs during formation of organism is understood.

Paper-IV Evolution and Functional Anatomy of Vertebrates

CO1: The course helps students to learn different theories of evolution, isolating mechanisms, speciation and evolution of Man.
CO2: Students gain knowledge of evolution of different Vertebrates.
CO3: Anatomy of Vertebrate skeletal, Digestive and respiratory systems are known to students.
CO4: Physiology of Excretory system, Nervous system in vertebrates is understood. Knowledge of Amniotic egg, fertilization, placenta is gained by students.

Semester-III

Paper-I Systems Biology

CO1: Knowledge of Concepts of systems biology.
CO2: Students understand mammalian biological clocks, metabolic cycles, pest management and bioremediation.
CO3: Different predictive models, modelling tools will be understood.
CO4: students learn application of system biology and application of nanoparticles in biological system.

Paper-II Research Methodology

CO1: Various methods of sampling, Data collection and experimental design useful for the Research is understood by the student.
CO2: Students understand the use of computers in statistics and present the research findings in scientific way.
CO3: Knowledge of different types of inferential tools used in research is imparted to the students.

CO4: Students gain knowledge of writing research paper, project works. Knowledge of copyright, patent, laboratory safety, animal ethics is gained.

Paper-III Comparative Animal Physiology- I

CO1: Course helps students to understand various physiological process related to digestion and nutrition.
CO2: knowledge of gaseous exchange, respiratory pigments and adaptation of animals at different pressure with respect to respiration is gained by the students.
CO3: In depth knowledge of osmoregulation, excretory mechanisms and temperature regulation is known by the students.
CO4: Students understand fatty liver, electrolyte imbalance, heat stroke chronic obstructive pulmonary disease is done by studying the course.

Paper-IV Endocrinology

CO1: Basic concepts of Hormones is understood.
CO2: Different hormones produced in Invertebrates and Vertebrates is known.
CO3: Knowledge of synthesis and action of hormones is gained in the course.
CO4: Students learn role of hormones in reproduction.

Semester – IV

Paper-I Animal Biotechnology

CO1: Concepts of Biotechnology and application in improvement of livestock is understood.
CO2: Usage of various techniques and methods related to cell and tissues culture is learnt.
CO3: Knowledge of production of Transgenic animals, genetically engineered animal cell is imparted to the students.
CO4: Various applications of biotechnology in medicine, environment, pest control and Aquaculture is learnt by the students.

Paper-II Fish Biology

CO1: Students learn general characters and classification of fishes.
CO2: Students understand concepts related to locomotion, feeding, osmoregulation and migration of fishes.
CO3: Skeletal, Digestive, Respiratory, Circulatory and Excretory systems of fishes are learnt.
CO4: The knowledge of Nervous system, Endocrine system, Reproductive system and

development of fishes is gained by the students.

Paper-III Comparative Animal Physiology-II

CO1: Physiology of various receptors in animal body, Physiology of nervous system and integration of nervous system with behavior of animals is known by the students.
CO2: Mechanisms of movement and structures related to movement is understood.
CO3: Knowledge of structure of heart of different animals and circulation process in animals is gained in the course.
CO4: Hormones in relation to growth and development and biological rhythms is learnt in the course.

Paper-IV Project

CO1: Knowledge gained by the students from studying Research methodology paper in semester-III helps the students to do further research.
CO2: Formation of hypothesis for research, experimental design, analysis of results will be learnt by the student.
CO3: Students will be able to present the research findings in a systematic way for paper Presentation.
CO4: Students will be able to publish their research findings in Journals.