Department of Zoology

M.Sc. in Zoology (CBCS) Four-Semester Programme

The Zoology major offers scientific training in the diversity, organismal biology, ecology, and evolution of animals. The major core provides a solid foundation in the biological sciences, while electives allow students to cater coursework to meet specific interests in animal biology.

1. Understand the biological diversity and grades of complexity of various animal forms through their systematic classification and comparative structural studies. Develop a holistic appreciation on the phylogeny and adaptations in animals

2. Understand the taxonomic procedures to identify a species. Acquire the skills of nomenclature of species and subspecies.

3. Understand the roles of plants, animals and microbes in the sustainability of the environment and their interaction among themselves and deterioration of the environment due to anthropogenic activities.

4. Understand the concepts and principles of biochemistry, immunology, physiology, ethology, endocrinology, developmental biology, cell biology, genetics, molecular biology and microbiology

5. Generate an interest in the subject and help students explore the new developments in Biochemistry. Develop an idea on structure and functioning of biologically important molecules

6. Perform laboratory procedures as per standard protocols in the areas of animal diversity, systematics, cell biology, genetics, biochemistry, molecular biology, microbiology, physiology, immunology, developmental biology, environmental biology, ethology, evolution and Entomology

7. Learn how earth was formed and how life started and evolved on the planet through process of organic evolution. Get exposed to the basics and advances in ethology.

8. Develop technical skills in biotechnology, bioinformatics and biostatistics.

9. Delve into the wonderful world of insects, their success on the planet and their diversity

10. Acquire knowledge on harmful and beneficial insects, their adaptations for life and control measures.

11. Equip the learner to use the tools and techniques for project work/ research in biology · Get skills in Histological & biochemical techniques.

12. Department offer five elective papers to their students- Applied entomology, Resource ecology, Molecular Biology, Environment Biology & Toxicology & Applied Parasitology. In elective papers students are acquainted with special skill about their objectives , doing project work, preparation of review article, paper & poster presentation and learnt some advance skill based techniques

Course outcome:

Course Code	Course Name	Course Outcome
Semester 1	**ZCT 101 Invertebrate Functional Forms and Adaptations**	1. Students will get a vivid idea about the origin, diversification of metazoan creatures and probable reasons of some of the metazoan groups. 2. Students will be able to compare various metazoan groups relating to their feeding strategy, locomotion, respiration, defence, nervous coordination and reproduction. 3. They will explore the world of sponges in relation to medicinal significance. 4. They will be acquainted with the language of insect communication and its application in the field of applied insect science. 5. Students will have an elaborative idea about some minor metazoan phyla. 6. They will gain knowledge about a modern discipline: Regenerative Biology.
	ZCT 102 Ecological Theory	1. Students will get details about growth models and its mathematical interpretations as well as metapopulation and life histories. 2. Students will get a vivid knowledge on community ecology including biodiversity, different ecological modelling. 3. They will also get knowledge about how to manage the invasive species or restoration of a degrading ecosystem. 4. They will also gain a detailed idea of different areas of behaviour ecology like parental investment, evolution of sex etc. 5. Students will get an elaborative idea on ecological footprint and ecosystem services.
	ZCT 103 Cell Biology	1. The course serves as an introduction for students to the fundamental concepts of cells and their constituents. 2. It aims to establish a solid groundwork regarding the essential building blocks of life. 3. The syllabus gives the students an exposure to different techniques to identify different cell organelles so that they get motivated to pursue research. 4. By the conclusion of the course, students will possess a solid understanding of cell functions, laying a strong foundation in this area of study.

	ZCT 104 Genetics	1. Genetics and its extension and inheritance biology; variations and mutation; 2. Advanced areas like gene therapy, cancer therapy techniques, personalized medicine and pharmacogenomics, genetic screening and counseling, as well as basic concept about databases will also be covered. 3. Further, students will learn about the overview of cellular structure and division, cytoskeleton and cellular transport, cell signaling, molecular mechanisms apoptosis, cellular senescence, chaperones, exosome biogenesis and function, transcriptomics, along with metabolome and metabolic disorders.
Semester 2	**ZCT 206 Vertebrate Functional forms and Adaptation**	1. The students will understand the origin and evolutionary relationship in different subphylums of chordates. 2. They will understand the diversity of chordates and their physiological systems. 3. They will further understand the structural adaptations including structural elements of the body and their properties.
	ZCT 207 Development biology and Neurobiology	1. The students will learn about principles of developmental biology, metamorphosis and organogenesis in Drosophila model organisms and regenerative biology. 2. They will also learn about neurogenesis, neural plasticity, different kinds of neurotransmitters and different aspects of neuronal disorders.
	ZCT 208 Biochemistry and Genetic Engineering	1. Students will learn about the properties of macro- and micro-biomolecules (nucleic acid, proteins, lipids, carbohydrates and amino acids) and their relevance to physio-chemical functions. 2. They will be able to correlate the biomolecules in studying body metabolism and metabolism related disorders. 3. They will know the details of enzymes and coenzymes and role of vitamins in our body physiology. 4. They will be acquainted with the antioxidants and free radicals. 5. The students will gain sufficient knowledge on bioenergetics including ETC and ATP synthesis. 6. They will be able to know basic aspects of genetic engineering, principles and methodologies of biotechnology and their applications as well as various molecular techniques.

	ZCT 209 Parasitology and Immunology	1. The course provides a broad introduction to the immune system 2. It covers various aspects such as organs, cells, and receptors. 3. It educates students on the molecular mechanisms behind antigen recognition, hypersensitivity reactions, and antigen-antibody interactions. 4. Additionally, the course aims to cultivate in students an understanding of the fundamental principles of immunology and how they can be applied to the treatment of human diseases. 5. The syllabus of parasitology gives the students an overview of several protozoan and helminthic parasites, their immune evasion strategies and the molecular basis of their antigenic variation.
Semester 3	**ZCT 311 Conservative biology**	1. Students will benefit from this course by studying different aspects of conservation , biodiversity patterns. 2. They will also get knowledge on how climate change affects biodiversity. 3. They will also learn conservation at genetic level. 4. From this course, details about the conservation strategy and conservation of habitats will also be learnt . 5. 5.Student will also get a vivid knowledge on designing and managing protected areas.
	ZCT 312 Endocrinology and Comparative Animal Physiology	
	ZET 313-328	
	ZET 326 Applied Immunology	1. The primary objective of the special paper in Applied Immunology is to equip students with comprehensive knowledge and expertise in both fundamental and advanced concepts within a broad context that encompasses the application of Immunology. 2. Through a comprehensive approach that includes classroom instruction, laboratory work to enhance practical skills, seminars to develop presentation and communication abilities. 3. Additionally, students will have the opportunity to execute small projects for partial completion of their syllabus under the guidance and mentorship of academic and subject matter experts.
	ZET 328	1. The course provides wider knowledge on the current

	Applied Parasitology	national and international public health problems and issues. 2. It gives a general approach on role of vectors and reservoirs in public health. 3. Students get advanced knowledge on some important microbial and medically important parasites.
	ZET 314 Resource Ecology	1. Students from this specialised course will learn about Resource consumer interactions as well as demographic analysis. 2. They will also learn about different modes about population growth including models on dynamics of metapopulation . 3. They will gain knowledge on theories of communities and its applications. 4. They will also study the different aspects of natural resources and areas of sustainable development . 5. They will gain knowledge on statistical methods used in research and quantitative methods used to study network, food web, and biodiversity.
	ZET 315 Environmental Biology and Toxicology	1. Students will get a detailed account of environmental toxicity caused due to the different sources of pollution and pollutants. 2. Students will develop critical-thinking skills, analyse real-world problems and understand the power of narrative to create sustainable solutions for local and global communities. 3. They will identify potential environmental impacts and involve themselves in different allied projects.
	ZET 318 Applied Entomology	1. Students will be acquainted with the surveillance, assessment, biology, nature of damage and various management practices of insect pests. 2. They will learn about functional physiology of insects with special reference to feeding & reproductive potentials, diapause and metamorphosis. 3. They will get knowledge on insect-insecticide interaction dynamics and insecticide efficacy. 4. They will be able to explore various avenues of application of insects especially as bio-indicators, forensic investigation of crime, insects as food and as therapeutic agents etc. 5. They will get a vivid knowledge on insect vectors and vector-borne diseases having public health importance
	ZET 320 Molecular Cell Biology	1. The syllabus gives the students an exposure to different molecular and associated cell biology techniques so that they get motivated to pursue research. 2. The course serves as an in-depth course for the students to acquire concepts and details of cellular mechanisms of protein sorting, cell-cell communication and stem cell biology.

		3. It aims to establish a solid academic background regarding cell cycle, cell death and cell renewal. 4. The students will know details of molecular mechanisms of cancer and oncogenesis. 5. They will also be familiar with fundamental and advanced techniques of PCR, cell culture techniques, FACS, IHC etc.
Semester 4	**ZCT 429 Taxonomy & Biostatistics**	1. The students will learn about the importance of Statistics in the field of biology in handling huge amount of biological data. 2. They will be able to differentiate between population and sample; sampling methods and sampling errors. 3. The students will be able to apply various aspects of descriptive statistics in solving biology related problems. 4. They will learn about how to erect statistical hypotheses and how to test these with possible rejection or acceptance of Null hypothesis. 5. They will be acquainted with the field of Animal Taxonomy with special reference characters of taxonomic importance, various schools of classification, using tools to construct phylogenetic tree or dendrogram. 6. They will know about rules of ICZN and will have knowledge about molecular taxonomy.
	ZCT 430 Animal Bahaviour And Evolutionary Biology	1. The most interesting course for the student which gives an overall idea about cooperative behaviour and conflict over mate choice. 2. Foraging behaviour and Aggressive behaviour is also a part of this course which will provide a good understanding of a new aspect of behaviour study to the student. 3. The student will also get a vivid knowledge about evolutionary biology by studying natural selection and adaptation . 4. Study of gene frequencies and other evolutionary processes is another aspect of this course. 5. Students will also learn how the pattern and trends of evolution occur through a population.