Department of Zoology

B Sc. ZOOLOGY

PO and CO

Programme Outcome

- This program is the fundamental unit of basic sciences studied at Graduate level.
- Understanding about the fundamental concepts, principles and processes underlying the academic field of Zoology and its different subfields (animal diversity, principles of ecology, comparative anatomy and developmental biology of vertebrates, physiology and biochemistry, genetics and evolutionary biology, animal biotechnology, applied Zoology, aquatic biology, immunology, reproductive biology, and insect, vectors and diseases, apiculture, aquarium fish keeping, medical diagnostics, and sericulture) (ii) procedural knowledge that creates different types of professionals in the field of Zoology and related fields such as, apiculture, medical diagnostics, and sericulture, etc.(iii) skills related to specialization areas within Zoology as well as within subfields of Zoology, including broader interdisciplinary subfields (Chemistry, bio-Physics and Mathematics).
- Students gain knowledge and skill in the fundamentals of animal sciences, understands the complex interactions among various living organisms
- The courses should be delivered in terms of concepts, mechanisms, biological designs & functions and evolutionary significance cutting across organisms at B.Sc. level. These courses should be studied by students of all branches of biology.
- Both chalk and board, and PowerPoint presentations can be used for teaching the course.
- The students should do the dissertation/ project work under practical of different courses, wherever possible.
- Analyse complex interactions among the various animals of different phyla, their distribution and their relationship with the environment
- Apply the knowledge of internal structure of cell, its functions in control of various metabolic functions of organisms.
- Apply the knowledge and understanding of Zoology to one’s own life and work
- Develops empathy and love towards the animals.
- The program helps to develop scientific tempers and attitudes, which in turn canprove to be beneficial for the society since the scientific developments can makea nation or society to grow at a rapid pace.
- This will provide them ample opportunities to explore different career avenues.

- The program will also provide a platform for classical genetics in order tounderstand distribution or inheritance of different traits
- Science graduates can go to serve in industries or may opt for establishingtheir own industrial unit.
- Practical and theoretical skills gained in this program will be helpful in designingdifferent public health strategies for social welfare.
- They should be able to appreciate shifting their orientation of learning from a descriptive explanation of biology to a unique style of learning through graphic designs and quantitative parameters to realize how contributions from research and innovation have made the subjects modern, and applied and laid the foundations of Zoology, Animal Sciences, Life Sciences, Molecular Biology and Biotechnology.
- These courses and their practical exercises will help the students to apply their knowledge in future course of their career development in higher education and research.
- In addition, they may get interested to look for engagements in industry and commercial activities employing Life Sciences, Molecular Biology and Biotechnology.
- The program has been designed to provide in-depth knowledge of appliedsubjects ensuring the inculcation of employment skills so that students can achieve a career and become an entrepreneur in diverse fields.
- After Undergraduate, students can get admission to M.Sc. Zoology, M.Sc., Environmental Science. M.Sc., Biotechnology etc.
- The successful students will be able to establish research organizations with the help of agriculture, environment protection and also their own industry for transgenic animals, clinical pathology, genetic counseling, human karyotyping etc. Scientific Research Organizations. Universities in India & aboard.
- Contributes the knowledge for Nation building

Course Outcome :

B.Sc.Sem- I	
PAPER I: Animal Diversity- I Theory and Practical	• Provides students with an in-depth knowledge of the diversity in form, structure and habits of invertebrate • Learn basics of systematics and understand hierarchy of different categories • Obtain overview of economically important invertebrates. • Classify all the invertebrate phyla up to class. • Develop understanding in the diversity of the life in regards to protists and Non chordates • Group the animals on the basis of morphological

	structures • Develop critical understanding about evolution of animals and acquire knowledge of both living and extinct animals
Paper II Animal diversity-II Theory and Practical	• Provides students with an in-depth knowledge of the diversity in form, structure and habits of vertebrates • Learn general characters and classification of different classes of vertebrates • Understand the vertebrate evolutionary tree. • Obtain overview of economically important vertebrates.
PAPER III Comparative Anatomy of vertebrates Theory and Practical	• This course provides students with the basic knowledge in vertebrate anatomy and biology from both functional and evolutionary points of view. • Students also gain knowledge about fundamental steps in vertebrate development from fertilization to organogenesis. • The students will be able to describe the vertebrate structures and relate morphology, function and evolution.
PAPER- IV Developmental Biology of vertebrates Theory and Practical	• Be able to list the types of characteristics that make an organism ideal for the study of developmental biology • Know the broad phylogenetic relationships of animal phyla • Be able to describe the stages and cellular mechanisms like invagination, of gastrulation in the frog and chick . Be able to describe the functions of gastrulation. • Be able to describe in general terms how vertebrates gastrulate (frog, fish, chick, and mammal). • Be able to label macromeres, mesomeres, and micromeres and know which cell types are derived from each of these cell layers in the early embryo (e.g. primary and secondary mesenchyme, ectoderm, endoderm, mesoderm).

B.Sc. II (Sem–III& IV)

CHOICE BASED CREDIT SYSTEM Syllabus: ZOOLOGY

B.Sc. II (Sem–III& IV)	
Paper- V Cell Biology Theory and Practical	• Cellular architecture & their functions at organismic level. This knowledge will help students in future to explore areas like: oncology, medical diagnosticsand treatment • Understand the functioning of nucleus and extra nuclear organelles and understand the intricatecellular mechanisms involved. • Acquire the detailed knowledge of different pathways related to cell signaling and apoptosisthus enabling them to understand the anomalies in cancer. • Develop an understanding how cells work in healthy and diseased states and to give a 'healthforecast' by analyzing the genetic database and cell information. • Get new avenues of joining research in areas such as genetic engineering of cells, cloning,vaccines development, human fertility programme, organ transplant, etc.
Paper –VI Principles of Ecology Theory and Practical	• Ecological principles & applications that govern the planet Earth • This knowledge will help students in future to explore areas like: biodiversity, conservation biology, forestry & natural resource management • Know the evolutionary and functional basis of animal ecology. • Understand what makes the scientific study of animal ecology a crucial and exciting endeavor. • Engage in field-based research activities to understand well the theoretical aspects taught besides learning techniques for gathering data in the field. • Analyze a biological problem, derive testable hypotheses and then design experiments and put the tests into practice. • Solve the environmental problems involving interaction of humans and natural systems at local or global level.
Semester-IV	
PAPER-VII: Fundamentals of Biochemistry	• Understand the structure and biological significance of carbohydrates, amino acids,proteins, lipids and

Theory and Practical	nucleic acids. • Understand the structure and function of immunoglobulins. • Understand the concept of enzyme, its mechanism of action and regulation. • Understand the process of DNA replication, transcription and translation. • Learn the preparation of models of peptides and nucleotides. • Learn biochemical tests for amino acids, carbohydrates, proteins and nucleic acids. • Learn measurement of enzyme activity and its kinetics.
PAPER-VIII Animal Physiology: Controlling and Coordinating Systems Theory and Practical	• Acquire knowledge of the coordinated physiological functioning • Realize that very physiological mechanisms are used in very diverse organisms. • Understand how cells, tissues, and organisms function at different levels. • Develop an understanding of the related disciplines, such as cell biology, neurophysiology, pharmacology, biochemistry etc • Get a flavor of research by working on project besides improving their writing skills. • It will further enable the students to think and interpret individually. • Undertake research in any aspect of animal physiology in future.

B.Sc. III Choice Based Credit System (CBCS)
Semester-V & VI

B.Sc. III-Zoology (Semester-V and VI)	
Paper- Core-IX- Non-chordates Theory and Practical	• Understand the anatomical features of non-chordates through type study • Provides students with an in-depth knowledge of the diversity in form, structure and habits of invertebrates. • Learn basics of systematics and understand hierarchy of different categories. • Learn diagnostic characteristics of different phyla through brief studies of examples. • Classify the invertebrate phyla up to class. • International rules of nomenclature and classification is studied. • Dissections (Audio visual)of different systems of invertebrate animals are to be studied such as leech, Starfish etc
Paper-Core-X Developmental Biology Theory and Practical	• Study various stages involved in the developing embryo of Amphioxus and Chick. • Study initial developmental procedures involved in Amphioxus and Chick. • Understand the experimental procedures of embryology. • Identify various stages of embryological development of Amphioxus and chick through slides and models. • Understand the placenta of mammals, applications of ultra sound for foetus study and Causes of miscarriage. • Dissections (Audio visual)of different systems of Vertebrate animals are to be studied such as Scoliodon, Rat, *Labeo* , etc.
Paper- Core-XI Comparative Anatomy of Chordates Theory and Practical	• In this segment we teaches about the comparative structures and Evolution of Integument, heart, aortic arches, kidney, respiratory organs, brain of different animals which give them a definite idea not only the structure but also the structural development of that organ and how they become modified according to their need and environment. • Understand the types of Fish scales, Feathers, mammalian skin and organs.
DSE- XII-A Biostatistics, Bioinformatics, Medical Zoology	• Understand the frequency distribution, Measures of Central Tendency, Standard Deviation & Standard Error, Student-T-test.

and Evolutionary Biology Theory and Practical	• Understand the vertebrate evolutionary tree. • Review basic concepts and functional knowledge in the field of informatics. • Get awareness about the nature of the emerging digital knowledge society. • Learn the application and scope of Bioinformatics. • Understand the pathogenic bacteria, Viruses and parasites and parasitic diseases. • Mode of transmission, portal of entry and implications of parasitism. • Understand the Hardy-Weinberg Law of genetic equilibrium, Genetic drift and Migration
Paper-DSE- XII-B Biodiversity and Conservation Biology Theory and Practical	• Articulate why society strives to conserve biodiversity. • Identify key threats to biodiversity. • Understand what is meant by biodiversity and its value • Understand current threats to biodiversity; • Recall the basic concepts of conservation practices. • Understand the role and principles of operation of different types of protected areas; • Analyze the range of options for biodiversity conservation Measure and compare levels of biodiversity between areas
Semester-VI	
Paper-Core-XIII Physiology Theory and Practical	Understand the functions of important physiological systems Able to perform, analyse and report on experiments and observations in physiology
Paper- Core-XIV Economic Zoology Theory and Practical	• Get an idea of the applied branches of zoology with a view of educating youngsters on the possibilities of self-employment • Study the culture and breeding of common edible fishes. • Understand the basic concepts, Economic zoology, sericulture, Marine, Offshore and Inland Fish culture, Prawn and Lobstar culture, Pearl culture. • Understood the applications of Biological sciences in Aquaculture and Agriculture. • Understand the effect of agricultural pests on various crops.
Paper-Core-XV Molecular Biology and Biotechnology Theory and Practical	• Understand the organization of DNA • Understand the Genetic Code • Understand the genome organization in higher

	organisms. • To understand the steps involved in recombinant DNA technology. • Understand the Recombinant DNA technology • Understand the applications of Biotechnology
Paper-DSE-XVI Endocrinology, Environmental Biology and Toxicology Theory and Practical	• Structures of the various endocrine glands, their development, their histology. • Understand the classification of the hormones, their basic structure, and their mechanism of action. • The regulation of hormone synthesis and secretion. • To Understand characteristics and faunal adaptations of • Fresh water, Marine Water and Terrestrial Ecosystem. • To understand the types of toxicants and their effect on health.
Paper-DSE-XVI-B Techniques in Biology Theory and Practical	• To understand laboratory equipment and their applications. • Discuss the applications of biophysics and principle involved in bio-instruments. • To acquire the knowledge and practical skills of using instruments in biology and medical field. • Design and conduct independent laboratory or field research that is consistent with the highest standards and practices of research in the relevant biological sub-discipline