# COURSE, PROGRAM OUTCOMES & PROGRAM SPECIFIC OUTCOMES OF ZOOLOGY

## Programme Outcome:

The subject of zoology is one of the most fundamental programmes of basic sciences studied at undergraduate level. The programme helps develop scientific temperament and attitude in students. After studying this programme, students will be well equipped to learn and know about different biological systems, their coordination and control as well as evolution, behaviour and biological roles of the animals in the ecosystem which is very essential to preserve and conserve endangered species in each ecosystem. Moreover, they will also be able to qualitatively and quantitatively analyse evolutionary parameters using various bioinformatics and computational tools used in modern sciences. This will provide them ample opportunities to explore different career avenues. The programme will also provide a platform for classical genetics in order to understand distribution or inheritance of different traits and diseases among populations and ethnicity.

After the completion of this course, students will have the option to go for higher studies i.e., M. Sc. in Zoology and can also prepare for different competitive posts like Forest Ranger, Sericulture invigilator, horticulture and Agriculture and also professional job oriented courses, such as Indian Civil Services, Indian Forest Service, and Indian Police Service etc.

#### **Course Objectives:**

- The programme in zoology aims to equip students with recent advances in zoology from organism to reductionist biology.
- It also aims to empower students to understand the challenges of society and the country that fall into the realms of zoology, such as Aquaculture, Reproductive health, Behaviour and Biological time keeping, Cancer Biology, Micro biome and their roles in health and diseases, Bioremediation of pollutants and pesticides etc.
- It also offers students a series of elective courses that they may choose to specialize in the specific area of their interests in zoology.
- The open elective has been chosen to attract students from diverse interdisciplinary areas of sciences, such as Anthropology, Environmental studies, Biomedical Sciences, etc.

- This course is designed to ignite the inquisitive mind to pursue research in interdisciplinary areas. The fourth semester offers a total of 16 elective courses, which for logistics of programme management, are divided in to four streams, where a student has to choose a stream. In the entire course, the major emphasis is on skill-based training into socially relevant areas of zoology.
- It is expected that a student after successfully completing the programme would sufficiently be skilled and empowered to solve the problems in the realms of zoology and its allied areas.
- They would have plethora of job opportunities in the education, environment, and agriculture based, and health related sectors.
- The bright and ignited mind may enter into research in the contemporary areas of zoological/biological Sciences.
- The broad skills and the deeper knowledge in the field would make them highly successful and excellent researcher in advanced areas of research in the Biological sciences.

#### Course outcomes of B Sc I Sem :

Paper I <sup>st</sup> Animal Diversity (Non- Chordates)	<b>In Non-Chordates,</b> Students will have learning about the basic taxonomy, systematic and classified knowledge of phylum Protozoa to Echinodermata viz and viz structure, function and biology of these taxonomic estagories. Students will have knowledge of basics of
	parasitology such as origin and evolution of parasitism, role of vectors, parasitoids, host-parasite interactions, their life cycles.
	epidemiology, pathology, diagnosis, symptoms and treatments.
Dom on IInd	In Critalagy students will understand the structures positions and
Paper II	in Cytology, students will understand the structures, positions and
Cytology, Genetics,	functions of plasma membrane and all cellular organelles in detail.
Taxonomy and	They will acquire knowledge about chromosomes and cell divisions,
Evolution	both mitosis and meiosis. They will also know about cell signalling and its cancers causing factors.
	<b>In genetics.</b> students will learn the fundamental genetics like
	Mendelian and Non Mendelian inheritances linkages mutations sex
	determination in animals and genetic diseases etc
	determination in annuals and genetic diseases etc.
	In Evolutionary biology, students will know about Rules of nomenclature, Taxonomic methodology and tools, population

**B.Sc I<sup>st</sup> year** 

genetics, human evolution, various concepts about origin of species,
extinctions, phylogenetic and tree making and Evolution at molecular
level.

### Course outcomes of B Sc I Sem :

Paper	In Animal Physiology, students will understand the physiology of muscles,
Animal	nerves, digestion, respiration, circulation, excretion, bone, reproductive systems
Physiology and	and histology of organs and tissues. They will also learn basics of
Biochemistry	endocrinology with classification of hormones, and hormone receptor complex
	and mode of molecular actions, physiological function, feedback controls and
	related disorders. Students will also learn structure and functioning of immune
	cells, immunoglobulins, antigens and their interactions with antibodies.
	In Biochemistry, students will learn fundamental biochemistry of
	carbohydrates and its metabolism, proteins, lipids, enzymes and vitamins, their
	functions. They will also understand the nature, mechanism, and kinetics of
	enzyme action and oxidative phosphorylation and redox reactions etc.

# Course outcomes of B Sc II Sem :

Paper	In Cytology, students will understand the structures, positions and
Cytology and	functions of plasma membrane and all cellular organelles in detail. They
Genetics	will acquire knowledge about chromosomes and cell divisions, both
	mitosis and meiosis. They will also know about cell signalling and its
	cancers causing factors.
	In genetics, students will learn the fundamental genetics like Mendelian
	and Non Mendelian inheritances, linkages, crossing over, chromosome
	structure and function, mutations, sex determination and sex inheritance
	in animals, mutations and genetic diseases etc.

### Course outcomes of B Sc II year :

Paper I <sup>st</sup>	In chordates, students will learn the classification, structure, function
Animal	and biology of chordates of different taxonomic classes. They will also
Diversity– II	learn some special topics like metamorphosis, snake bites, snake poison
(Chordata),	apparatus and parental care of fishes and amphibian etc., and also study
Developmental	important Reptilian, Aves and Mammalian groups.
Biology and	
Palaeontology	In Developmental biology, Students will learn the different aspects of
	early, late and post embryonic developments. They will have the
	knowledge about implications of developmental biology in various fields,
	such as in teratogenesis, stem cell biology, Fate maps, their formation and
	significance etc.
	In Palaeontology, students will learn about formation of fossils, types,
	their significance and methods to determining the age of fossils. They
	will also learn about geological time scale.
Paper II <sup>nd</sup>	In Ecology, students will understand the various features and aspects of
Ecology,	population ecology, community ecology and ecosystem ecology. They
Animal	will have the knowledge about environmental biology and issues related
Behaviour and	to biodiversity loss and conservation as well as forests and wildlife in
Applied	details.
Zoology	
	In Animal Behaviour, Students will know in details about patterns of
	behaviour, survival strategies, social and cooperative behaviours,
	migration of birds, role of biological clock in animal world and in human
	health and behaviour.
	In Applied Zoology, students will have knowledge about the basics of
	Sericulture, Apiculture and Lac culture etc., and learn details about
	taxonomy and biology, insects, pests as well as their interactions with
	crops and their management policies in detail.

# Course outcomes of B Sc III Year :

Paper–I	In Microbiology, students will learn how microbes are very useful in every
Microbiology,	aspect of modern human life viz. in food industry, in bioremediation, in
Biological	medicines and disease therapy etc.
Techniques	
<b>Biostatistics and</b>	In Biological Techniques, students will have basic idea of instrumentation such
Bioinformatics	as microscopy, chromatography, electrophoresis, centrifugation, and
	spectrophotometry etc. They also learn various molecular tools and techniques
	like PCR, southern, northern and western blotting, etc.
	In Biostatistics, students will study about Computer Fundamentals (Hardware &
	Software), Input, Output Devices, Web Browsers, Search Engines, Types of

	Networks, Intra and Internet etc.
	<b>In Bioinformatics,</b> students will learn Scope and Application of Bioinformatics like NCBI Data Model, DNA and Protein Sequence Database, Motif Analysis, Structural Database, Structural Viewers (Rasmol, Rastop, Cn3D, CSHF Chimera, Swiss PDB Viewer, Pymol) etc.
Paper II	In Animal Physiology, students will understand the physiology of muscles,
Animal	nerves, digestion, respiration, circulation, excretion, bone, reproductive systems
Physiology,	and histology of organs and tissues. They will also learn basics of endocrinology
Biochemistry,	with classification of hormones, and hormone receptor complex and mode of
Histology and	molecular actions, physiological function, feedback controls and related
Toxicology	disorders. Students will also learn structures and functions of immune cells,
	immunoglobulins, antigens and their interactions with antibodies.
	<b>In Biochemistry,</b> students will learn fundamental biochemistry of carbohydrates, proteins and lipids and their functions and metabolism of carbohydrates. They will also understand the nature, mechanism, and kinetics of enzyme action and oxidative phosphorylation and redox reactions.
	<ul> <li>In Histology, students will have knowledge of structure of epithelium, connective tissue, cartilage, bone, smooth, striped and cardiac muscles, and nervous tissue and all body organs as studied under light microscope.</li> <li>In Toxicology, students will get to know introduction, brief history and general principles of toxicology. They will also study about Environmental toxicology, its kinds and sources, Dose response relationship and determination of TLm values, Ld50, Lc50 and threshold limits.</li> </ul>