**Programme Outcomes (POs) for MSc in Zoology**

**1. Advanced Knowledge in Zoology:**

 - Gain an in-depth understanding of zoology core and specialised areas, such as animal physiology, genetics, evolution, ecology, biodiversity, and biotechnology.

**2. Research and Analytical Skills:**

 - Develop the ability to design, conduct, and analyse scientific research using advanced methodologies, tools, and techniques in zoology and related disciplines.

**3. Critical Thinking and Problem-Solving:**

 - Cultivate the ability to critically evaluate scientific literature, identify research gaps, and propose innovative solutions to complex biological problems.

**4. Laboratory and Field Expertise:**

 - Acquire hands-on experience in advanced laboratory techniques, fieldwork, and data collection relevant to zoological studies.

**5. Interdisciplinary Approach:**

 - Integrate knowledge from related fields such as biochemistry, microbiology, environmental science, and bioinformatics to address zoological challenges.

**6. Communication and Presentation Skills:**

 - Effectively communicate scientific findings through technical writing, presentations, and publications in peer-reviewed journals.

**7. Ethical and Environmental Awareness:**

 - Understand the ethical implications of zoological research and develop a sense of responsibility toward biodiversity conservation, animal welfare, and environmental sustainability.

**8. Career Readiness:**

 - Prepare for diverse career opportunities in academia, research, wildlife management, environmental consultancy, biotechnology, and allied fields.

**9. Lifelong Learning:**

 - Foster a mindset for continuous learning and professional development to stay updated with advancements in zoology and related sciences.

**10. Contribution to Society:**

 - Apply zoological knowledge to address global challenges such as wildlife conservation, climate change, disease control, and sustainable development.

**Programme -Specific Outcomes (PSOs) for MSc Zoology**

**1. Advanced Knowledge in Core and Specialized Areas**

 Gain in-depth understanding of core zoological subjects such as:

* + Animal diversity, physiology, and biochemistry.
	+ Genetics, evolution, and developmental biology.
	+ Ecology, environmental biology, and conservation.
	+ Immunology, endocrinology, and neurobiology.
	+ Develop expertise in specialized areas like molecular biology, biotechnology, and wildlife management.

**2. Research and Analytical Skills**

Design and conduct independent research projects in zoology and related fields. Use advanced laboratory techniques, such as:

* + Microscopy, chromatography, and electrophoresis.
	+ DNA sequencing, PCR, and bioinformatics tools.
	+ Analyse and interpret scientific data using statistical and computational methods.

**3. Fieldwork and Biodiversity Assessment**

* + Conduct fieldwork to study animal behaviour, ecology, and biodiversity.
	+ Identify and classify animals using taxonomic keys and modern tools.
	+ Assess the impact of environmental changes on wildlife and ecosystems.

**4. Interdisciplinary Applications.**

* + Integrate knowledge from biochemistry, microbiology, and environmental science to solve zoological problems.
	+ Apply biotechnological tools for animal health, disease management, and conservation.

**5. Communication and Scientific Writing**

* + Prepare research reports, theses, and scientific papers for publication.
	+ Present research findings at seminars, conferences, and workshops.

**6. Ethical and Environmental Awareness**

* + Understand the ethical implications of animal research and experimentation.
	+ Develop strategies for biodiversity conservation and sustainable development.

**7. Career and Professional Development**

* + Prepare for careers in academia, research, wildlife management, environmental consultancy, and biotechnology.
	+ Develop teaching skills to mentor undergraduate students in zoology.

**Course Outcome (COs) for MSc in Zoology**

Zoo - 101 BIOSYSTEMATICS, BIOINFORMATICS AND NON-CHORDATES

| Sl No | Course Outcome |
| --- | --- |
| 1 | To provide basic idea about classical and modern taxonomic approaches. |
| 2 | To provide methodological background and quantitative skills in morphology-based taxonomy and systematics. |
| 3 | To provide basic ideas about different databases, and usability of available data for predicting molecular phylogeny and protein structure. |
| 4 | To have an understanding of different parasites causing human diseases. |
| 5 | To obtain a thorough understanding of the processes in invertebrates. |

Zoo - 102 CELL BIOLOGY AND GENETICS

| Sl No | Course Outcome |
| --- | --- |
| 1 | To understand the structures and purposes of basic components of prokaryotic and eukaryotic cells, especially macromolecules, membranes, and organelles. |
| 2 | To get thorough understanding of structure and function of cellular cytoskeleton, cell cycle regulation, apoptosis, and cancer. |
| 3 | To be familiar with recombinant technology and its application. |
| 4 | To be familiar with the various genetic and molecular changes occurring in a normal cell during malignant transformation. |
| 5 | To provide the fundamental knowledge on classical genetics, genetic disorders, and the methods of gene transfer. |

Zoo - 103 PHYSIOLOGY, HISTOLOGY AND HISTOCHEMISTRY

| Sl No | Course Outcome |
| --- | --- |
| 1 | To learn and understand the fundamental scientific concepts relating to a broad range of topics in animal physiology and their interactions to maintain body homeostasis. |
| 2 | To understand several processes essential for maintaining the body’s biochemical balance for normal functioning. |
| 3 | To improve the student’s perspective of health and biology through in-depth study of human physiology. |
| 4 | To have a basic understanding of different tissues and a detailed method of histology. |
| 5 | To understand the basics of histochemistry. |

Zoo - 104 TOOLS AND TECHNIQUES IN BIOLOGY

| Sl No | Course Outcome |
| --- | --- |
| 1 | To provide a basic idea about the working principles of different microscopes and their application in biological sciences. |
| 2 | To provide a detailed account of different separation techniques and their application in biological research. |
| 3 | To give basic knowledge about different techniques pertaining to protein from quantification, and identification to structure elucidation. |
| 4 | To provide a detailed understanding of several diagnostic techniques and their applications including several in vitro immunoassay techniques and several hybrid imaging techniques. |
| 5 | To equip the learner to use the tools, techniques, and statistical methods for project work/research in biology. |

Zoo - 105 BIOCHEMISTRY AND BIOPHYSICS

| Sl No | Course Outcome |
| --- | --- |
| 1 | To understand the biophysical properties and chemical foundation of life processes. |
| 2 | To have a basic idea of cellular nutrients, and energy production process. |
| 3 | To understand the structure and metabolism of biologically significant molecules. |
| 4 | To have a basic understanding of protein building blocks and their synthesis. |
| 5 | To explain the role of catabolic and anabolic pathways in cellular metabolism. |

**Zoo - 201 BIOPHYSICS AND BIOCHEMISTRY**

| **Sl No** | **Course Outcome** |
| --- | --- |
| 1 | To understand the biophysical properties and chemical foundation of life processes. |
| 2 | To have a basic idea of cellular nutrients, and energy production process. |
| 3 | To understand the structure and metabolism of biologically significant molecules. |
| 4 | To have a basic understanding of protein building blocks and their synthesis. |
| 5 | To explain the role of catabolic and anabolic pathways in cellular metabolism. |

Zoo - 202 MICROBIOLOGY AND IMMUNOLOGY

| Sl No | Course Outcome |
| --- | --- |
| 1 | To help students develop skills necessary for critical analysis of microbes and microbial processes. |
| 2 | To have a better understanding of microbial diseases including host-parasite interaction. |
| 3 | To learn the organization, malfunctioning and disorders of the immune system. |
| 4 | To learn the regulation and processing of immune responses. |
| 5 | To get a broad understanding of antigens, antibodies and vaccines. |

Zoo - 203 ENDOCRINOLOGY AND REPRODUCTIVE PHYSIOLOGY

| Sl No | Course Outcome |
| --- | --- |
| 1 | To impart knowledge on structure, function, and regulation of different endocrine glands of vertebrates. |
| 2 | To have a better understanding of the anatomy of glands and synthesis of different hormones. |
| 3 | To give the basic concepts on hormone signaling and role of endocrine organs in different reproductive phases of animals. |
| 4 | To provide basic idea about structure, function, and physiological role of endocrine system. |
| 5 | To give a better idea about the endocrine system during reproduction and different aspects of fertility and contraception. |

Zoo - 204 EVOLUTIONARY BIOLOGY AND ANIMAL BEHAVIOUR

| Sl No | Course Outcome |
| --- | --- |
| 1 | To understand the evidence that living species share descent from common ancestry. |
| 2 | To have an understanding of genetic variation in a population and its influence on social behaviour and human health. |
| 3 | To gain a basic idea about the adaptability influenced and gradual change in the appearances and characteristics of organisms. |
| 4 | To provide a basic idea about different aspects of animal behaviour and different means to study them. |
| 5 | To have a better understanding of the regulatory basis of animal behaviour. |

Zoo - 301 CHORDATES, COMPARATIVE ANATOMY AND ECONOMIC ZOOLOGY

| Sl No | Course Outcome |
| --- | --- |
| 1 | To be familiar with the anatomical design and evolutionary affinities of primitive chordates phyla with their general and distinguishing characteristics. |
| 2 | To have a better understanding of the origin and evolution of advanced chordates. |
| 3 | To learn different anatomical structures across chordates phyla. |
| 4 | To understand the biology and culture of various insects of economic importance. |
| 5 | To understand the basic biology, common diseases and culturing techniques for animals of economic importance. |

Zoo - 302 DEVELOPMENTAL BIOLOGY

| Sl No | Course Outcome |
| --- | --- |
| 1 | To understand the basic concept and experimental aspect of developmental biology using model organisms. |
| 2 | To have a thorough understanding of sex cell development and fertilization. |
| 3 | To study the developmental aspects including metamorphosis. |
| 4 | To have an understanding of the early embryonic precursor process and organogenesis. |
| 5 | To elucidate the interaction of genes and environment during development. |

Zoo - 303 ENVIRONMENTAL BIOLOGY AND WILDLIFE CONSERVATION

| Sl No | Course Outcome |
| --- | --- |
| 1 | To provide a holistic idea of populations, their interactions, and communities. |
| 2 | To understand the processes associated with climate change, carbon budget, and related environmental processes. |
| 3 | To generate ideas on the ecological concept of conservation. |
| 4 | To have an understanding of wildlife, its conservation, and related laws. |
| 5 | To have understanding of modern conservation techniques and patent filing procedures. |

Zoo - 304 ALLIED ELECTIVE COURSE: ANIMAL PHYSIOLOGY AND DEVELOPMENTAL BIOLOGY

| Sl No | Course Outcome |
| --- | --- |
| 1 | To study the mechanism of working of different organs and their role in the maintenance of body homeostasis. |
| 2 | To learn the mechanism of development of animal embryos. |

Zoo-401B STRUCTURE AND FUNCTION OF VERTEBRATES

| Sl No | Course Outcome |
| --- | --- |
| 1 | To get the idea on structural modification of integuments, endoskeleton, nervous system and urogenital system |
| 2 | To study the Outline classification and evolution in Chordates |
| 3 | To study the General plan of blood circulation in various groups |
| 4 | To understand Respiratory system |
| 5 | To study the evolution of heart. |

Zoo - 402B POPULATION GENETICS AND EVOLUTION

| Sl No | Course Outcome |
| --- | --- |
| 1 | To familiarize the students with the concept of evolutionary forces and their role in the cause of genetic variations in a population.  |
| 2 | To analyze the role of genetic factors in speciation |

Zoo - 403B ENVIRONMENTAL BIOLOGY AND TOXICOLOGY

| Sl No | Course Outcome |
| --- | --- |
| 1 | To study the science of environment and to find out the cause of environment toxicity. |
| 2 | To study Sustainable management of the environment |

Zoo - 404B PROJECT AND PROJECT DISSERTATION

| Sl No | Course Outcome |
| --- | --- |
| 1 | Each student has to carry out a project (either an experiment or a review), submit a dissertation and make a PowerPoint presentation of the work before the examiners. |