## BA / BSc / BCom - Program Outcomes

On completion of undergraduate programme, the student is expected to achieve the following programme outcomes

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| PO1 | Knowledge (Remembering) | Demonstrate basic factual and procedural knowledge in the chosen field of study.<br>Recall and recognize key concepts, terms, and theories.<br>Summarize and explain fundamental principles and historical developments. |
| PO2 | Comprehension (Understanding) | Interpret and explain the significance of information and concepts.<br>Translate complex ideas into simpler terms for understanding.<br>Compare and contrast different theories or viewpoints within the discipline. |
| PO3 | Application (Applying) | Apply theoretical knowledge to practical situations or real-world problems.<br>Use appropriate methods and techniques to solve discipline-specific problems.<br>Demonstrate the ability to implement concepts in hands-on experiences or internships. |
| PO4 | Analysis (Analyzing): | Break down complex issues into their component parts.<br>Identify patterns, relationships, and causes within the discipline.<br>Evaluate the validity of arguments and evidence. |
| PO5 | Synthesis (Creating) | Integrate knowledge from various sources to develop innovative solutions.<br>Design and create original projects, research, or products.<br>Generate new ideas, hypotheses, or theories within the field. |
| PO6 | Evaluation (Evaluating) | Assess the quality and reliability of information and data.<br>Critically evaluate the strengths and weaknesses of different approaches.<br>Make informed judgments and recommendations based on evidence. |

## Under Graduate Programme Specific Outcome (PSO)

On completion of undergraduate programme, the student is expected to achieve the following programme specific outcomes:

**B.Sc Zoology**

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| PSO1 | Taxonomic Proficiency (Understanding and Applying) |
| PSO2 | Ecological Analysis (Analyzing and Evaluating) |
| PSO3 | Laboratory and Field Research Skills (Creating and Analyzing) |
| PSO4 | Animal Physiology and Adaptation (Applying and Evaluating) |
| PSO5 | Ethical and Conservation Awareness (Evaluating and Ethical and Social Responsibility) |

## BSc Zoology Course Outcomes (CO)

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| 1 | CC-1 | Non-Chordates I: Protista to Pseudocoelomates | CO1 | Understanding of Invertebrate Diversity |
| | | | CO2 | Comparative Anatomy and Physiology |
| | | | CO3 | Life Cycles and Reproduction |
| | | | CO4 | Ecological Roles and Interactions |
| | | | CO5 | Conservation and Biodiversity |
| 1 | CC-2 | Principles of Ecology | CO1 | Understanding Ecological Concepts |
| | | | CO2 | Analyzing Ecosystem Structure and Function |
| | | | CO3 | Population Ecology |
| | | | CO4 | Community and Ecosystem Ecology |
| | | | CO5 | Applied Ecology and Conservation |
| 2 | CC-3 | Non-Chordates: Coelomates | CO1 | Understanding Invertebrate Diversity |
| | | | CO2 | Comparative Anatomy and Physiology |
| | | | CO3 | Life Cycles and Reproduction |
| | | | CO4 | Ecological Roles and Interactions |
| | | | CO5 | Conservation and Biodiversity |
| 2 | CC-4 | Cell biology | CO1 | Understanding Cellular Structures and Functions |
| | | | CO2 | Cellular Processes and Regulation |
| | | | CO3 | Cell Signaling and Communication |
| | | | CO4 | Experimental Techniques and Data Analysis |
| | | | CO5 | Ethical Considerations and Scientific Communication |
| 3 | CC-5 | Diversity of Chordates | CO1 | Understanding Chordate Diversity |
| | | | CO2 | Comparative Anatomy and Physiology |
| | | | CO3 | Life Histories and Reproduction |
| | | | CO4 | Ecological Roles and Interactions |
| | | | CO5 | Conservation and Biodiversity |
| 3 | CC-6 | Physiology: Controlling and coordinating systems | CO1 | Understanding Physiological Control Mechanisms |
| | | | CO2 | Homeostasis and Regulation |
| | | | CO3 | Neurophysiology and Endocrinology |
| | | | CO4 | Physiological Adaptations and Responses |
| | | | CO5 | Clinical Applications and Ethical Considerations |

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| 3 | CC-7 | Fundamentals of Biochemistry | CO1 | Understanding Biochemical Principles |
| | | | CO2 | Molecular Mechanisms and Reactions |
| | | | CO3 | Metabolism and Energy |
| | | | CO4 | Biotechnological Applications |
| | | | CO5 | Ethical Considerations and Scientific Communication |
| 4 | CC-8 | Comparative anatomy of Vertebrates | CO1 | Understanding Vertebrate Diversity |
| | | | CO2 | Comparative Anatomy and Function |
| | | | CO3 | Functional Morphology and Adaptations |
| | | | CO4 | Evolutionary Trends and Development |
| | | | CO5 | Ethical Considerations and Conservation |
| 4 | CC-9 | Physiology: Life sustaining systems | CO1 | Understanding Life-Sustaining Systems |
| | | | CO2 | Integration and Homeostasis |
| | | | CO3 | Transport and Exchange |
| | | | CO4 | Adaptations and Responses |
| | | | CO5 | Clinical Applications and Ethical Considerations |
| 4 | CC-10 | Biochemistry of metabolic processes | CO1 | Understanding Metabolic Pathways |
| | | | CO2 | Metabolic Regulation and Control |
| | | | CO3 | Bioenergetics and Energy Transfer |
| | | | CO4 | Intermediary Metabolism and Integration |
| | | | CO5 | Clinical Applications and Ethical Considerations |
| 5 | CC-11 | Molecular Biology | CO1 | Understanding Molecular Biology Fundamentals |
| | | | CO2 | Molecular Techniques and Laboratory Skills |
| | | | CO3 | Genome Structure and Function |
| | | | CO4 | Molecular Genetics and Genetic Engineering |
| | | | CO5 | Ethical Considerations and Scientific Communication |
| 5 | CC-12 | Principles of Genetics | CO1 | Understanding Genetic Fundamentals |
| | | | CO2 | Genetic Analysis and Problem Solving |
| | | | CO3 | Molecular Genetics and Genetic Technologies |
| | | | CO4 | Genetics in Evolution and Biomedical Contexts |
| | | | CO5 | Ethical Considerations and Scientific Communication |
| 5 | DSE-1 | Animal behavior and chronobiology | CO1 | Understanding Animal Behavior |
| | | | CO2 | Chronobiology and Biological Rhythms |
| | | | CO3 | Observation and Data Collection |
| | | | CO4 | Adaptations and Evolution of Behavior |
| | | | CO5 | Ethical Considerations and Scientific Communication |
| 5 | DSE-2 | Animal Biotechnology | CO1 | Understanding Biotechnological Principles |
| | | | CO2 | Biotechnological Applications in Animal Breeding |
| | | | CO3 | Genetic Modification and Transgenesis |
| | | | CO4 | Disease Management and Biopharmaceuticals |
| | | | CO5 | Ethical and Regulatory Considerations |
| 6 | CC-13 | Developmental Biology | CO1 | Understanding Developmental Processes |

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| | | | CO2 | Developmental Stages and Morphogenesis |
| | | | CO3 | Genetic and Epigenetic Regulation |
| | | | CO4 | Experimental Techniques and Model Organisms |
| | | | CO5 | Evolutionary Developmental Biology |
| | CC-14 | Evolution Biology | CO1 | Understanding the Principles of Evolution |
| | | | CO2 | Mechanisms of Evolution |
| | | | CO3 | Phylogenetics and Evolutionary Trees |
| | | | CO4 | Macroevolution and Adaptation |
| | | | CO5 | Ethical Considerations and Contemporary Issues |
| 6 | DSE-3 | Basics of Neuroscience | CO1 | Understanding Neural Fundamentals |
| | | | CO2 | Neuronal Signaling and Communication |
| | | | CO3 | Neurobiology of Behavior |
| | | | CO4 | Neuroscientific Techniques and Research |
| | | | CO5 | Ethical Considerations and Clinical Applications |
| | DSE-4 | Biology of Insecta | CO1 | Understanding Insect Diversity |
| | | | CO2 | Insect Life Cycles and Ecology |
| | | | CO3 | Behavior and Communication |
| | | | CO4 | Physiology and Adaptations |
| | | | CO5 | Applied Entomology and Pest Management |

Practicals

Laboratory provides a wide space for students to nurture their hidden scientific potential, creative thinking and systematic analyzing skills. Through B. Sc. Zoology programme, students will realize how theory, experiment and observation are mutually correlated and help each other to expand the frontiers of knowledge of the physical universe. By conducting various experiments, students will be able to internalize a number of skills and they will be benefited in life in many ways as follows:

CONSOLIDATED STRUCTURE OF MODEL I PRACTICALS

FOR SEMESTERS I - VI

| Semester | Title of the Practical | CO | COURSE OUTCOME |
|---|---|---|---|
| Sem-1 | Non-Chordates I: Protista to Pseudocoelomates | CO1 | Apply taxonomic keys and morphological characteristics to accurately identify and classify non-chordate organisms within the Protista to Pseudocoelomate groups.<br>Analyze the structural and functional adaptations of these organisms that contribute to their classification. |
| | Principles of Ecology | CO2 | Apply ecological field research techniques to collect data on biodiversity, population dynamics, or ecosystem interactions in natural or simulated environments.<br>Analyze and interpret collected data to draw ecological conclusions and make recommendations for conservation or management. |
| Sem-2 | Non-Chordates: Coelomates | CO1 | Proficiently perform dissections of coelomate non-chordate organisms, such as arthropods or annelids, to expose and examine their internal anatomical structures.<br>Analyze and describe the morphological adaptations and functions of various anatomical features, such as organs, appendages, and sensory structures, in coelomate organisms. |
| | Cell biology | CO2 | Demonstrate proficiency in using light and electron microscopes to observe and analyze cellular structures and processes. |

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| | | | Analyze and interpret cellular morphology, organelle distribution, and cellular activities, such as mitosis or cell division, through microscopic examination. |
| Sem-3 | Diversity of Chordates | CO1 | Apply taxonomic keys, anatomical knowledge, and other criteria to accurately identify and classify different chordate organisms.<br>Analyze and describe the anatomical features and adaptations that define each chordate taxon, including key characteristics like notochords, dorsal nerve cords, and pharyngeal gill slits. |
| | Physiology: Controlling and coordinating systems | CO2 | Design and conduct experiments to investigate physiological control mechanisms, such as neural control of muscle contraction, hormonal regulation of metabolism, or autonomic control of organ functions.<br>Analyze experimental data, including measurements of physiological variables, to draw conclusions about the control and coordination of specific physiological processes. |
| | Fundamentals of Biochemistry | CO3 | Proficiently execute a range of biochemical techniques, such as protein assays, enzyme kinetics, nucleic acid purification, or chromatography.<br>Analyze experimental data generated from biochemical assays, including quantification of biomolecules and interpretation of reaction kinetics. |
| Sem-4 | Comparative anatomy of Vertebrates | CO1 | Proficiently conduct dissections of representative vertebrate organisms, such as fish, amphibians, reptiles, birds, and mammals, to examine their internal and external anatomical features.<br>Analyze and compare the anatomical structures and adaptations of different vertebrate taxa, identifying both commonalities and unique characteristics. |
| | Physiology: Life sustaining systems | CO2 | Design and perform experiments related to vital physiological systems, such as the cardiovascular system, respiratory system, or renal system.<br>Analyze experimental data, including physiological measurements and observations, to draw conclusions about the functioning and regulation of these systems. |
| | Biochemistry of metabolic processes | CO3 | Proficiently conduct biochemical assays to measure enzymatic activities, substrate utilization, or metabolic intermediates in various metabolic pathways.<br>Analyze experimental data, including kinetic parameters, metabolic flux, and enzyme regulation, to understand the biochemical basis of metabolic processes. |
| Sem-5 | Molecular Biology | CO1 | Proficiently perform a range of molecular biology techniques, such as DNA extraction, polymerase chain reaction (PCR), gel electrophoresis, and DNA sequencing.<br>Analyze experimental data generated from molecular biology experiments, including DNA fragment sizes, sequence data, or gene expression profiles. |
| | Principles of Genetics | CO2 | Proficiently conduct genetic experiments, including genetic crosses, pedigree analysis, and gene mapping, to investigate Mendelian inheritance patterns.<br>Analyze experimental data, including Punnett squares, genetic ratios, and linkage analysis, to draw conclusions about genetic principles and inheritance. |
| | Animal behavior and chronobiology | CO3 | Plan and execute behavioral observations and experiments to investigate animal behavior, circadian rhythms, or biological clock mechanisms.<br>Analyze behavioral data and chronobiological measurements to identify patterns, correlations, and trends related to animal activities and biological rhythms. |

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| | Animal Biotechnology | CO4 | Proficiently perform biotechnological techniques, such as gene cloning, transgenesis, genetic modification, or cell culture, in the context of animal systems.<br>Analyze experimental data and results to understand the impact of biotechnological interventions on animal organisms or cells. |
| Sem-6 | Developmental Biology | CO1 | Design and perform experiments related to developmental biology, including studies on embryonic development, organogenesis, or tissue regeneration.<br>Analyze experimental data, including developmental stages, morphological changes, and gene expression patterns, to draw conclusions about the mechanisms and regulation of developmental processes. |
| | Evolution Biology | CO2 | Design and execute experiments or investigations related to evolutionary biology, such as studies on adaptation, speciation, or phylogenetics.<br>Analyze and interpret experimental or comparative data, including genetic sequences, fossil records, or ecological observations, to draw conclusions about evolutionary processes. |
| | Basics of Neuroscience | CO3 | Design and perform experiments related to basic neuroscience principles, including neural signaling, sensory processing, or synaptic transmission.<br>Analyze experimental data, including electrophysiological recordings, neuroimaging results, or behavioral observations, to draw conclusions about neural mechanisms and functions. |
| | Biology of Insecta | CO4 | Proficiently design and perform experiments, observations, or field studies related to insect biology, behavior, ecology, or physiology.<br>Analyze and interpret data collected from these studies to draw conclusions about various aspects of insect biology, such as life cycles, feeding behaviors, or ecological interactions. |