## Name of the Programme: B. Sc. Zoology (FYUGP)

## Programme Outcomes (PO)

**After completing the Four-Year Undergraduate Programme in Zoology, Students are expected to achieve the following Programme Outcomes:**

**PO1: Critical Thinking:**
The graduates of Zoology should be competent for critical analysis of problems related to biology, sustainable uses of biological resources and their conservation strategies. They will gain the ability to rationally analyse and conduct guided academic inquiries in various areas of interest in the chosen discipline

**PO2: Communication Skills:**
Capability to convey the intricate information effectively and efficiently and development of soft skills. The students will gain the ability to present and express information, thoughts, experiments and results clearly and concisely for effective communication of any issues related to animals.

**PO3: Problem Solving:**
Solve the problems related to animal sciences without relying on assumptions and guess work.

**PO4: Analytical and Logical Reasoning:**
Capability of seeking solutions and logically solving them by experimentation and data processing either manually or through software.

**PO5: Research-oriented Skills:**
Ability to use tools and techniques used in different fields of Zoology and research carry out research effectively.

**PO6: Cooperation/Teamwork/Leadership:**
Ability to work effectively in a heterogeneous team. Ability to recognise and mobilise relevant resources essential for a project. Manage the project in a responsible way by following ethical scientific conduct and bio-safety protocols.

**PO7: Reflective Thinking:**
To relate new knowledge to prior understanding and knowledge and engage own's thinking and learning strategies. After completion of the course the students will be able to understand the value of animal resources, need for conservation, bio-prospecting and sustainable utilization of resources for human welfare.

**PO8: Digital Literacy/Use of Modern Tools:**
Capable of using computers for biological simulation, computation and appropriate software for biostatistics, and employing search tools to locate, retrieve, and evaluate zoology-related data.

**PO9: Environmental Awareness:**
Demonstrate awareness on environment, wild life conservation, management and contribute as policy makers in wild life conservation, animal preservation and environment protection.

**PO10: Entrepreneurship and Employability:**
In-depth knowledge of applied subjects ensuring the inculcation of employment skills so that students can make a career and become an entrepreneur in diverse fields of aquatic biology, sericulture, apiculture etc.

## Programme Specific Outcomes (PSO)

The programme specific outcomes of the Undergraduate Programme in **Zoology** are listed below. After completing the programme, the students will be able to-

**PSO1:** Understand the identification, classification and differentiate diverse non-chordates and chordates based on their morphological, anatomical and systemic organization and to describe economic, ecological and medical significance of various animals in human life.

**PSO2:** Develop practical skills in identifying and classifying various non-chordate species using morphological and genetic techniques.

**PSO3:** Know the practical skills in biotechnology, biostatistics, bioinformatics and molecular biology and understand the basic experimental skills in various techniques in the fields of genetics; molecular biology; biotechnology; qualitative and quantitative microscopy; enzymology and analytical biochemistry.

**PSO4:** Understand about the in-depth knowledge and about comparative anatomy and developmental biology of various biological systems; and about the organisation, functions, strength and weaknesses of various systems and the way evolution has shaped these traits in the human body.

**PSO5:** Get knowledge about the state of degradation and conservation status, as well as the present state and health of ecosystems at local and global levels.

**PSO6:** Understand habitat management, restoration methods, and species conservation tactics in both local and regional perspective.

**PSO7:** Combine concepts to establish a link between physiological knowledge and practical issues, such as homeostatic imbalances and choices for a healthy lifestyle.

**PSO8:** Possession of practical expertise in identification of insect vectors & mechanisms of their disease transmission as well as application of environmental, biological, & chemical management techniques as well as vector control methods.

## Course Outcomes (CO)

**B.Sc. 1st Semester**

**Course Title: Animal Diversity I**

Course Code: ZOOC1
Nature of Course: Core
Total Credits: 04

***On completion of this Course, the students will be able to –***

**CO1:** Gain comprehensive knowledge of the diversity of non-chordates, including their classification, phylogeny, and evolutionary relationships.

**CO2:** Understand the morphology, anatomy, and physiology of non-chordates, highlighting their unique adaptations, characteristics and pathogenicity.

**CO3:** Learn about the ecological roles and behaviors of non-chordates, including their interactions with the environment and other organisms.

**CO4:** Develop skills in identifying and classifying various non-chordate species using morphological and genetic techniques.

**Course Title:** Animal Diversity I
Course Code: MINZOO1
Nature of Course: Minor
Total Credits: 04

***At the end of this course, the students will be able to:***

**CO1:** Gain comprehensive knowledge of the diversity of non-chordates, including their classification, phylogeny, and evolutionary relationships.

**CO2:** Understand the morphology, anatomy, and physiology of non-chordates, highlighting their unique adaptations, characteristics and pathogenicity.

**CO3:** Learn about the ecological roles and behaviors of non-chordates, including their interactions with the environment and other organisms.

**CO4:** Develop skills in identifying and classifying various non-chordate species using morphological and genetic techniques.

**Course Title:** Natural Resource Management
Course Code: GECZOO1
Nature of Course: Generic Elective Course-I
Total Credits: 03

***At the end of this course, the students will be able to:***

**CO1:** Know about the natural resources, its types, sustainable utilization and management practices. Detailed maps and inventories of natural resources, including forests, water bodies, wildlife, and mineral deposits.

**CO2:** Gain insights on the current condition and health of ecosystems, including the extent of degradation or conservation status.

**CO3:** Understand the identification and recommendation of sustainable management practices for various resources, such as water conservation techniques, sustainable forestry, or soil conservation methods.

**CO4:** Analyse the impact of human activities on natural resources and ecosystems, including pollution, deforestation, and climate change.

**B. Sc. 2nd Semester**

**Course Title:** Animal Diversity II
Course Code: ZOOC2
Nature of Course: Core
Total Credits: 04

***At the end of this course, the students will be able to:***

**CO1:** Gain insights into the diverse coelomate organisms, their identification and structural complexities including annelids, molluscs, arthropods, echinoderms, and chordates.

**CO2:** Gain a deep understanding of the evolutionary history and relationships among major animal groups, specifically the distinction between coelomates, acoelomates, and pseudo coelomates.

**CO3:** Compare the anatomical and physiological features of coelomates with those of other animal groups.

**CO4:** Analyse how coelomates interact with their environments and other organisms, including their roles in ecosystems and food webs.

**Course Title:** Animal Diversity II
Course Code: MINZOO2
Nature of Course: Minor
Total Credits: 04

***At the end of this course, the students will be able to:***

**CO1:** Gain insights into the diverse coelomate organisms, their identification and structural complexities including annelids, mollusks, arthropods, echinoderms, and chordates.

**CO2:** Gain a deep understanding of the evolutionary history and relationships among major animal groups, specifically the distinction between coelomates, acoelomates, and pseudo coelomates.

**CO3:** Compare the anatomical and physiological features of coelomates with those of other animal groups.

**CO4:** Analyze how coelomates interact with their environments and other organisms, including their roles in ecosystems and food webs.

**Course Title:** Wildlife Conservation and Management
Course Code: GECZOO2
Nature of Course: GE
Total Credits: 03

***At the end of this course, the students will be able to:***

**CO1:** Gain a comprehensive understanding of ecological principles, biodiversity, wildlife, habitats, threats and conservation measures.

**CO2:** Learn about species conservation strategies, habitat management, and restoration techniques.

**CO3:** Understand the local, national, and international policies, laws, and treaties related to wildlife conservation.

**CO4:** Acquire practical skills in wildlife monitoring, population assessment, and ecological surveying methods.

**B. Sc. 3rd Semester**

**Course Title:** Cell Biology
Course Code: ZOOC3
Nature of Course: Core
Total Credits: 04

***At the end of this course, the students will be able to:***

**CO1:** Understand fundamental principles of cell biology.

**CO2:** Explain structure and functions of cell organelles involved in diverse cellular processes.

**CO3:** Comprehend the process of cell signalling and its role in cellular functions and have an insight of how defects in functioning of cell organelles and regulation of cellular processes can develop into diseases.

**CO4:** Appreciate how cells grow, divide, survive, die and regulate these important processes. And learn the advances made in the field of cell biology and their applications.

**Course Title:** Comparative Anatomy of Vertebrates
Course Code: ZOOC4
Nature of Course: Core
Total Credits: 04

***At the end of this course the student will be able to:***

**CO1:** Gain comprehensive knowledge of the anatomical structures of various vertebrate groups, understanding their functional adaptations and evolutionary significance.
**CO2:** Understand the evolutionary relationships among vertebrates, recognizing homologous structures and tracing their modifications across different lineages.
**CO3:** Acquire proficiency in dissection techniques and the handling of anatomical specimens, both preserved and fresh.
**CO4:** Learn techniques for measuring and analysing anatomical structures quantitatively.

**Course Title:** Human Physiology
Course Code: MINZOO3
Nature of Course: Minor
Total Credits: 04

***At the end of this course, the students will be able to:***

**CO1:** Gain comprehensive understanding of the physiological functions of cells, tissues, organs, and systems in the human body. And basic knowledge of human anatomical structures and their relationship to physiological functions.
**CO2:.** Learn an integrative approach to understand the interactions of various organ systems resulting in the complex overall functioning of the body.
**CO3:** Recognize and explain how all physiological systems work in to maintain homeostasis in the body and use of feedback loops to control the same.
**CO4:** Synthesize ideas to make connections between knowledge of physiology and real-world situations, including healthy lifestyle decisions and homeostatic imbalances.

**Course Title: Insect Vectors and Diseases**

Course Code: GECZOO3
Nature of Course: GE
Total Credits: 03

***At the end of this course, the students will be able to:***

**CO1:** Gain comprehensive understanding of insect biology, taxonomy, physiology, and ecology.

**CO2:** Gain in-depth knowledge of the mechanisms of disease transmission by insect vectors, including the life cycles and understanding of epidemiological principles related to vector-borne diseases.

**CO3:** Gain proficiency in using modern diagnostic tools and techniques to identify insect vectors and detect pathogens. And skills in collecting, analysing, and interpreting epidemiological data to understand the dynamics of vector-borne diseases.

**CO4:** Get knowledge and practical skills in implementing vector control measures, including chemical, biological, and environmental management strategies.

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