Government City College (A)
Hyderabad-500002
(Affiliated to Osmania University)
Accredited with B++ Grade by NAAC

Department of Zoology
Course Outcomes:

Course Title: Invertebrates

On Completion of this course the students will be able to:

COS	Course Outcomes	Blooms Taxonomy Classification
CO1	Students will be able to recall and list the major phyla of invertebrates, including key characteristics and examples of each phylum.	Remembering
CO2	Students will be able to explain the fundamental physiological processes of invertebrates, such as respiration, digestion, and reproduction, and describe how these processes vary among different invertebrate groups.	Understanding
CO3	Students will be able to apply knowledge of invertebrate anatomy and physiology to predict responses to environmental changes or to identify adaptations to specific habitats.	Applying
CO4	Students will be able to analyze relationships among invertebrate groups to infer evolutionary patterns and to interpret phylogenetic trees. They will also be capable of dissecting invertebrate specimens to examine internal structures and understand their functional significance.	Analyzing
CO5	Students will be able to design a research project to investigate a question related to invertebrate biology, which may involve experimental design, data collection and analysis, and synthesis of findings with existing knowledge	Creating

Course Title: Vertebrates

On successful completion of the course, Students will be able to:

COS	Course Outcomes	Blooms Taxonomy Classification
CO1	Students will be able to identify and classify the major groups of vertebrates (fish, amphibians, reptiles, birds, and mammals) and recall key anatomical and physiological traits that distinguish these groups..	Remembering
CO2	Students will be able to describe the life cycles, reproduction strategies, and basic ecological niches of different vertebrate species, demonstrating comprehension of how vertebrates fit into their natural environments.	Understanding
CO3	Students will be able to apply principles of vertebrate anatomy and physiology to predict how vertebrates respond to environmental challenges, such as changes in habitat, climate, or availability of resources.	Applying
CO4	Students will analyze evolutionary relationships among vertebrate groups, utilizing phylogenetic trees and comparative anatomy to understand the evolutionary history and adaptations that have enabled vertebrates to colonize diverse environments.	Analyzing
CO5	Students will design and propose original research projects or conservation plans addressing specific challenges faced by vertebrates, to create innovative solutions or investigations.	Creating

Course Title: Animal Physiology and Animal Behavior

After completing the course students are expected to be able to:

COS	Course Outcomes	Blooms Taxonomy Classification
CO1	Students will recall the fundamental concepts of animal physiology, including homeostasis, hormonal regulation, neural functions, and the physiological basis of movement, respiration, digestion, and excretion. Students will identify and classify various types of animal behaviors, including foraging, mating, communication, and social behaviors.	Remembering
CO2	Students will explain how physiological systems in animals adapt to their environments and how these systems support survival, growth, and reproduction. Students will describe the ecological and evolutionary contexts in which different behaviors occur, using concepts such as natural selection, sexual selection, and kin selection.	Understanding

CO3	Students will apply knowledge of physiology to interpret experimental data or predict responses of animals to changes in their internal and external environments. Students will apply ethological theories and principles to analyze specific animal behaviors in natural or experimental settings.	Applying
CO4	Students will analyze the interconnections between different physiological systems within animals and how these systems co-evolve to meet ecological demands. Students will analyze behavioral data to infer patterns, identify adaptive behaviors, and understand the role of learning and memory in behavior.	Analyzing
CO5	Students will design experiments or models to test hypotheses related to animal physiology, demonstrating innovation in approach and methodology. Students will develop research proposals or experimental designs to investigate unanswered questions in animal behavior, incorporating innovative approaches to studying behavior in naturalistic or controlled environments.	Creating

Course Title: Cell biology, Genetics and Developmental biology

After completing the course students are expected to be able to:

COS	Course Outcomes	Blooms Taxonomy Classification
CO1	Students will recall the structure and function of cellular components (e.g., organelles, cytoskeleton) and basic cellular processes (e.g., cell cycle, signal transduction). Students will identify key concepts and terminologies in genetics, including Mendelian inheritance, molecular genetics, and population genetics. Students will memorize key events and stages in the development of model organisms, including human development.	Remembering
CO2	Students will explain the principles of cell communication, energy transformation, and how cells maintain homeostasis. Students will describe the mechanisms of gene expression, mutation, and genetic variability and their impacts on phenotypic diversity and evolution. Students will explain the mechanisms of cell differentiation, morphogenesis, and organogenesis, and how these processes are regulated at the genetic and molecular levels.	Understanding
CO3	Students will apply knowledge of cell biology to interpret experimental results or predict outcomes of cellular alterations in disease states or genetic modifications. Students will apply genetic principles to solve problems related to inheritance patterns, genetic diseases, and	Applying

	biotechnological applications. Students will apply concepts of developmental biology to understand developmental disorders, regenerative medicine, and the developmental basis of diseases.	
CO4	Students will analyze cellular mechanisms and pathways to understand their roles in complex biological processes and diseases. Students will analyze genetic data, such as pedigree charts, population genetics data, or molecular genetics experiments, to draw conclusions about genetic relationships and mechanisms. Students will analyze experimental designs and data in developmental biology research, understanding how gene function and regulation affect development.	Analyzing
CO5	Students will design experiments to investigate unanswered questions in cell biology, utilizing current technologies and methodologies. Students will propose research projects or genetic engineering applications based on current challenges in genetics, demonstrating innovation and ethical consideration. Students will design innovative research proposals or experiments to explore new aspects of developmental biology, incorporating techniques such as CRISPR, imaging, or computational biology.	Creating

Course Title: **Immunology and Biotechnology**

After completing the course students are expected to be able to:

COS	**Course Outcomes**	**Blooms Taxonomy Classification**
CO1	Students will recall the key components of the immune system (e.g., cell types, organs, and molecules) and basic immunological processes (e.g., antigen recognition, immune response activation). Students will identify the key techniques and applications of animal biotechnology, including genetic engineering, cloning, transgenic animals, and stem cell technology.	Remembering
CO2	Students will explain the mechanisms of innate and adaptive immunity, including how the body recognizes and responds to pathogens. Students will describe how biotechnological tools are used to modify animals for research, agriculture, medicine, and conservation.	Understanding

CO3	Students will apply immunological concepts to understand vaccination, hypersensitivity reactions, autoimmunity, and immunodeficiency disorders. Students will apply principles of genetic engineering and cloning to propose solutions for real-world problems, such as disease resistance in livestock or production of pharmaceuticals.	Applying
CO4	Students will analyze case studies or research data to identify the immunological basis of diseases and therapeutic interventions. Students will analyze ethical, legal, and social implications of animal biotechnology, critically assessing case studies and current policies.	Analyzing
CO5	Students will design a research proposal or project to investigate a novel question in immunology, potentially incorporating biotechnological tools and approaches. Students will propose innovative biotechnological projects aimed at improving human health, animal welfare, or environmental sustainability, demonstrating a comprehensive understanding of the technology's potential and limitations.	Creating

Course Title: Ecology, Zoogeography and Evolution

After completing the course students are expected to be able to:

COS	Course Outcomes	Blooms Taxonomy Classification
CO1	Students will recall basic ecological concepts, including ecosystem structure, biotic and abiotic interactions, and the cycles of matter and energy. Students will identify the major biogeographic regions of the world and the characteristic fauna of each region. Students will memorize key concepts and terminologies in evolutionary biology, including natural selection, genetic drift, and speciation.	Remembering
CO2	Students will explain the principles of population dynamics, community ecology, and ecosystem function. Students will describe the factors that influence animal distribution and the concepts of endemicity, dispersal, and vicariance. Students will explain the mechanisms of evolution and how they lead to the diversity of life on Earth.	Understanding
CO3	Students will apply ecological principles to analyze environmental issues, such as habitat destruction, biodiversity loss, and climate change impacts. Students will apply zoogeographical principles to predict the impacts of environmental changes on species distributions. Students will apply evolutionary theory to understand the	Applying

	development of antibiotic resistance, the emergence of new species, and the genetic basis of adaptation	
CO4	Students will analyze data from ecological studies to identify patterns and relationships in natural systems. Students will analyze patterns of species distribution to infer historical biogeographical events. Students will analyze phylogenetic trees and evolutionary data to infer relationships among species and the history of life.	Analyzing
CO5	Students will design an ecological research project or conservation plan, incorporating innovative approaches to solve environmental problems. Students will propose a study or conservation strategy addressing zoogeographical changes due to climate change, habitat fragmentation, or invasive species. Students will develop a research proposal or educational project that addresses a question or misconception in evolutionary biology, demonstrating an innovative approach to communicating science.	Creating