



Mahatma Gandhi Vidyamandir's

**Loknete Vyankatrao Hiray Arts, Science and Commerce College,
Panchavati, Nashik-422003**

(Affiliated to SPPU, Pune, Reaccredited with 'A' grade, Recipient of Best College Award by SPPU)

**Programme Specific Outcomes,
&
Course Outcomes of M.Sc**

Department of Zoology

Academic Year

2021-22

Programme Specific Outcomes: M.Sc. Zoology(PSZ)

Name of the Programme: M.Sc. Zoology	
Program Specific Outcomes	
At the end of the programme, student will be able to	
1	Acquire knowledge on the various aspects of life sciences including Biochemistry, Cell and Molecular Biology, Genetics, Physiology, Developmental Biology, Endocrinology, Mammalian reproductive physiology, Biotechnology and bioinformatics
2	Develop proficiency in the experimental techniques and methods of analysis appropriate for their area of specialization and relate concepts of comparative biology to explain evolution and success to live in varied environment.
3	Explain how organisms' function at the level of the gene, genome, cell, tissue, organ and organ-system and develop theoretical and practical knowledge in handling the animals and using them as model organism
4	Illustrate physiological adaptations, development, reproduction and behaviour of different forms of life. Develop personal and key transferable skills such as group work, presentation and report writing.
5	Apply ethical principles and commit to professional ethics and responsibilities and norms of the work/research practice.
6	Exhibit research ideas effectively in orally and writing; communicate with other with appropriate media, build interactive and presentation skills to meet global competencies.

Course Outcomes: M.Sc. Zoology(PSZ)

Class : M.Sc. Zoology		
Semester-I		
Paper	Course code & course title	At the end of the course, student will be able to
	PSZ(ZT 111): Biochemistry and Biochemical Techniques	Understand basic terms related to biochemistry and Biochemical Techniques, Prepare buffer of desire molarity & pH,
		Explain the principle and applications of various chromatographic techniques with examples
		Gain knowledge of structure & functions of Carbohydrates, proteins, lipids, nucleotides and nucleosides
		Understand the importance of tools and techniques in biology
		Learn principle, working, materials used and applications of electrophoresis.
		Describe the concept of light, electromagnetic spectrum and its application in absorption spectroscopy
	PSZ(ZT 112): Cell Biology and Developmental Biology	Define the term related in Cell Biology, Explain carbon as backbone of biomolecules.
		Illustrate the types, development and causes of tumour.
		Explain the concepts of cell signalling
		Understood the process of organogenesis of selected organs, development of extra embryonic membrane and the nature and physiology of placenta.
		Illustrate the inducer and inductor role in embryogenesis and knowledge about metamorphosis and the process of regeneration
		Understood the structure and functions of chromosome; mitotic and meiotic cell divisions and their significance
	PSZ(ZT 113): Genetics and English in Scientific Communication.	Understand the theories of classical genetics and blood group inheritance in man
		Described the genetic variation through linkage and crossing over, chromosomal aberrations and sex determination
		Explain the genetic defects and inborn errors of metabolism and genetic counselling and role of inbreeding and outbreeding
		Write the outline of a scientific paper, abstract, references, graphs, captions, conclusion etc.
		Critically analyse data from research; incorporate it into assigned writing clearly, concisely, and logically; and attribute the source with proper citation
		Justify the importance of plagiarism check and Proof-read given article.
	PSZ(ZT 114A): Biostatistics PSZ(ZT 114B): Freshwater	Illustrate the physicochemical properties of water
		Demonstrate the effect of pollutants on freshwater bodies
		Justify the presence of zooplanktons and aquatic forms in freshwater bodies

	Zoology (Optional, ANY ONE A/B)	Explain the types of aquatic habitats, the diagnostic features of shrimps
		Prepare the culture of Paramecium and Daphnia, Estimate the hardness and chloride content in water samples
		Analyse the Zooplanktons from local freshwater bodies, Evaluate the bio-indicators of pollution in freshwater
PSZ(ZT 115): Zoology Practical Paper-1		Demonstrate the working of different microscopes, colorimetric and spectrophotometric methods, cell fractionation and ligature in <i>Drosophila</i> larvae,
		Identify the developmental stages of chick embryo, cell structures and phases of cell division
		Determine the gene distance and order, genotype and phenotype ratios and allelic frequencies from the given data
		Prepare acid and base solutions of desired strength, buffers, bacterial Culture, chick embryo culture and <i>Drosophila</i> culture
		Prepare temporary slide of various cells to demonstrate the cell morphology and cell division, giant chromosome and pedigree analysis chart.
Semester-II		
	PSZ(ZT 121): Molecular Biology and Bioinformatics	Define the terms in Molecular Biology and Explain the DNA structure, types, topology, Physical properties; chromatin structure and organization.
		Understood DNA replication, RNA and protein synthesis and came to know protein synthesis can be controlled at the level of transcription and translation
		Discuss genome organization, DNA and Protein sequencing with their application in evolutionary studies
		Identify the grammatical mistakes from the given paragraph and common errors in written and spoken presentations
		Write a scientific paper and research article along with its proof reading.
		Demonstrate the working of different microscopes, colorimetric and spectrophotometric methods, cell fractionation and ligature in <i>Drosophila</i> larvae
	PSZ(ZT 122): Endocrinology and Parasitology	Understand the roles of Pituitary gland and pineal body. Explain hormonal regulation of biomolecules and mineral metabolism
		Gain knowledge of terms related to Endocrinology and parasitology
		Justify hormones as coordination molecules, biological clocks and rhythms
		Describe the role of osmoregulatory and gastrointestinal hormones and the role of hormones in moulting, change in body colour of crustaceans; yolk synthesis in amphibians; insect development
		Gain knowledge of the role of parasites in public health and hygiene
		Define the physiology and processes like digestion, respiration, muscle contraction and excretion.

	PSZ(ZT 123): Comparative Animal Physiology and Environmental Biology.	Comment on the structure and functions of various sense organs.
		Compare the physiology of regulatory mechanisms in various groups of animals.
		Illustrate the impact of climate and anthropogenic factors on biodiversity with reference to India
		Analyse the impact of lifestyle on the environment and animal life
		Compare the physiology of regulatory mechanisms in various groups of animals.
PSZ(ZT 124A): Metabolic pathways PSZ(ZT 124B): Metabolic pathways (Optional, ANY ONE A/B)	Identify the common fishes in India by external morphology	
	Understand and explain general characters and evolution of fishes, the fish morphology and anatomical modifications	
	Illustrate the physiology of reproductive and endocrine organs in fish	
	Discuss the signs, symptoms and control measures of common diseases in fish	
	Justify the role of respiratory and excretory organs in survival of fishes	
	Classify fishes up to order level and set up and manage aquarium	
PSZ(ZT 125): Zoology Practical Paper-2	Determine the bleeding and clotting time, heartbeat of crab, species richness in selected area, physico- chemical properties of soil and water	
	Perform Sterilization of lab equipment, prepare microbial culture, Isolate Bacterial, liver DNA and RNA from given sample, analyse protein sample by PAGE and SDS PAGE	
	Identify the various parasites and parasitic stages of common parasites, nitrogenous waste products of animals, freshwater planktons and slides of endocrine glands.	
	Demonstrate the role of eye stalk and insulin in sugar level in crab	
	Demonstrate the RBCs of common vertebrates and effect of various osmolarities.	
	Explain the principle and significance of gonadectomy, thyroidectomy and pancreatectomy	

Class : M.Sc. Zoology-II		
Semester-III		
Paper	Course code & course title	At the end of the course, student will be able to
	PSZ(ZT 131): Animal Physiology-I	Evaluate the physiological functioning of different organs
		Describe the anatomy of different physiological systems at the tissue and cellular levels
		Analyse the physiological changes in relation to environmental conditions.
		Identify different tissues related to anatomy and physiology from an evidence-based perspective
		Carry out physiological studies in the laboratory, interpret data and graphs and write a report.
		Correlate the organisms Internal and external environments with homeostasis and biological clocks
	PSZ(ZT 132): Fundamentals of Systematics and Economic Zoology	Illustrate the preparation and management of fish culture ponds
		Identify the fish diseases and the causative organisms.
		Mention the various composite fish culture with significance of each type.
		Explain the methods of freshwater prawn culture and its management and the methods of pearl culture and pearl harvesting
		Demonstrate the methods of packaging and transport of fish and brood fish.
		Illustrate techniques of fish harvesting, preservation & processing and development
	PSZ(ZT 133): Research Methodology and Insect Physiology and Biochemistry	Perform literature reviews using print and online databases, demonstrate knowledge of research processes (reading, evaluating, and developing
		Identify, explain, compare, and prepare the key elements of a research proposal/report
		Justify the rationale for research ethics
		Illustrate the structure, physiology and biochemistry of flight muscle
		Demonstrate the process of excretion, detoxification and water balance.
		Justify the role of insect hormones in physiological processes
	PSZ(ZT 134A): Immunology/ PSZ(ZT 134B): Genetic Toxicology (Optional, ANY ONE A/B)	Understand basic toxicological principles and describe how different chemicals are taken up by, processed in and eliminated from the body
		Inspect physical and chemical genotoxic agents being exposed in his/her environment
		Relate genotoxicity and DNA repair mechanisms and relate types of mutation and DNA repair
		Judge about proper genotoxicity test for mutation types
		Identify the microscopic structure of the lymphoid organs
		Demonstrate the double diffusion techniques, immunoelectrophoretic technique
		Prepare and write scientific report of field/ institutional visit
		Understand basic toxicological principles and describe how different chemicals are taken up by, processed in and eliminated from the body

	PSZ(ZT 134): Zoology Practical Paper-3	Demonstrate the effect of exercise on breathing, pulse rate and blood lactate level
		Demonstrate the effect of pH, temperature and inhibitors on salivary amylase
		Demonstrate the effect of body size and salinity on oxygen consumption in given animal.
		Map the taste buds on human tongue
Semester-IV		
	PSZ(ZT 141): Animal Physiology-II	Understand and define the concept of nutrition and digestion
		Explain the composition of blood, types of blood cells, vascular dynamics and clotting mechanism
		Illustrate the neuronal physiology and various potentials,
		Explain the anatomy and physiology of heart and cardiac cycle
		Diagrammatically represent the mechanism of respiration, gas exchange and transport of O ₂ and CO ₂
		Justify the location and structure of eye, ear and taste buds to their functions.
	PSZ(ZT 142): Mammalian Reproductive Physiology and Aquaculture	Explain the male and female reproductive systems and sexual dimorphic characteristics.
		Illustrate the reproductive dysfunctions.
		Diagrammatically represent the hormonal regulation of reproductive processes like pregnancy, lactation and parturition.
		Justify the location and structure of eye, ear and taste buds to their functions.
		Mention the various composite fish culture with significance of each type.
		Demonstrate the methods of packaging and transport of fish and brood fish.
	PSZ(ZT 143A): Histology and Histochemistry/ PSZ(ZT 143B): Pest Control (Optional, ANY ONE A/B)	Define the terminology related to Pest, nature of damage caused by pests and pest control
		Explain medical, veterinary, Household and stored grain pests and Integrated pest management (IPM)
		Understand the Non- insect pest and their control: Rat, Bandicoots, Crabs, Snails, Slugs, Birds and Squirrels.
		Understand and apply the principle and working of pesticide appliances
		Illustrate Autocidal control, Chemosterilants and radiations for sterilization, Male sterile Theory, Hormones and Pheromones
		Know the effects of contact insecticides and fumigants on behaviour of insect pests
	PSZ(ZT 144): Zoology Practical Paper-4	Explain the basic concepts of apiculture like systematics, colony organization, polymorphism, morphology and foraging
		Justify the presence of bees to increase the agriculture productivity
		Explain the importance of institutions pertinent to apiculture
		Identify Honey bee species, Castes and Bee morphology
		Illustrate importance of Bee products: Honey, Bees wax, Pollens, Royal Jelly, Propolis and Bee venom.
		Search bee flora in the locality and observations on bee foraging Behaviour
	PSZ(ZT 145): Pollution Biology PSZ(ZT 146B):	Illustrate importance of topic, material & Methods and reference work for research project
		Write effective scientific and technical communication based on the project
		Design experimentation to prove the hypothesis

	Apiculture(Optional, ANY ONE A/B)	Represent interpretations of research data within scientific and technical communities.
		Collect data, analyse and interpret it by field visits
		Understand research presentation, preparation of research article, reference work etc.

Head, Department of Zoology