PROGRAMME OUTCOMES AND COURSE OUTCOMES

2023 – 2024

Name of the Programme: M.Sc ZOOLOGY **PROGRAMME CODE: PSZO**

Programme Outcomes:

PO 1	Apply Acquired knowledge to solve major and complex issues in the society/industry.
PO 2	Attain research skills to solve complex Cultural, Societal and Environment issues.
PO 3	Employ latest and updated tools and technologies to solve complex issues.
PO 4	Demonstrate Professional Ethics that foster Community, Nation and Environment Building Initiatives.
PO 5	Develop the scientific temperament to carry out research project with professional ethics.

Course Outcomes:

Course Code	Course Title	Course Outcomes
23PG1Z1	Structure and Function of Invertebrates	CO 1 Remember the general concepts and major groups in animal classification, origin, structure, functions and distribution of life in all its forms. CO 2 Understand the evolutionary process. All are linked in a sequence of life patterns. CO 3 Apply this for pre-professional work in agriculture and conservation of life forms. CO 4 Analyze what lies beyond our present knowledge of life process. CO 5 Evaluate and to create the perfect phylogenetic relationship in classification.
23PG1Z2	Comparative Anatomy of Vertebrates	CO 1 Remember the general concepts and major groups in animal classification, origin, structure, functions and distribution of life in all its forms. CO 2 Understand the evolutionary process. All are linked in a sequence of life patterns. CO 3 Apply this for pre-professional work in agriculture and conservation of life forms. CO 4 Analyze what lies beyond our present knowledge of life process.

		CO 5 Evaluate and to create the perfect phylogenetic relationship in classification.
23PG1Z3	Lab Course in Invertebrates & Vertebrates	CO 1 Understand the structure and functions of various systems in animals CO 2 Learn the adaptive features of different groups of animals CO 3 Learn the mounting techniques CO 4 Acquire strong knowledge on the animal skeletal system CO 5 Learn the salient features and their modes of life
23PG1ZE1 (Elective 1)	Molecules and their interaction relevant to Biology	CO 1 Analyse the Structure of atoms, molecules and chemical bonds CO 2 Recall the structure, properties and metabolism of biomolecules. CO 3 Assess the mechanism of enzyme action. CO 4 Identify the structural conformation of proteins and nucleic acids CO 5 Describe the stabilization of interactions in biomolecules
23PG1ZE2	Fisheries & Aquaculture	CO 1 Identify the economically important fishes and fishery products. CO 2 Plans according to the recent concepts in fisheries management. CO 3 Distinguish the various aquaculture systems. CO 4 Organizes the type of hatchery, brood stock, larval production,

		feed management water quality and disease management in cultivable species, live feed production. CO 5 Evaluates the Fisheries and Aquaculture Practices in India.
23PG1ZE3 (Elective 2)	Biostatistics	CO 1 Clear understanding of design and application of biostatistics relevant to experimental and population studies. CO 2 Organise the research data in appropriate order and apply the measures of central tendency and dispersion values. CO 3 Acquired skills to perform various statistical analyses using modern statistical techniques and software. CO 4 Compute degrees of relationship variables using Correlation and Regression analysis CO 5 Knowledge on the merits and limitation of practical problems in biological/ health management study as well as to propose and implement appropriate statistical design/ methods of analysis.
23PG1ZE4	Environmental Toxicology	CO 1 Summarize the scope, importance, types and dose – response relationship of environmental toxicants. CO 2 Explain the transport and fate of toxicants in the environment. CO 3 Organize the events in the translocation of toxicants. CO 4 Analyse the nature of toxicity at organism, Organ and environmental level. CO 5 Assess the various methods of testing environmental toxicants
23PG1ZSE SEC - EDC	Sericulture	CO 1 Summarize the history, scope, source, types, importance and advantage of silk fibre in India. CO 2 Explain the distribution, morphology, cultivation techniques

		and disease of Mulberry plant. CO 3 Analyse the morphology, anatomy, life cycle of Bombyx mori CO 4 Explain the methods of rearing process. CO 5 Identify and explain the Cocoon harvesting and marketing.
23PG2Z4	Cell and Molecular Biology	CO 1 Understand the general concepts of cell and molecular biology. CO 2 Understand the general concepts of cell and molecular biology. cellular structures influencing functional features. CO 3 Perceive the importance of physical and chemical signals at the molecular level resulting in modulation of response of cellular responses. CO 4 Updated the knowledge on the rapid advances in cell and molecular biology for a better understanding of onset of various diseases including cancer. CO 5 Understand the general concepts of cell and molecular biology.
23PG2Z5	Developmental Biology	CO 1 Define the concepts of embryonic development CO 2 Observe various stages of cell divisions under microscope CO 3 Understand the formation of zygote CO 4 Differentiate the blastula and gastrula stages CO 5 Learn the distinguishing features of three different germ layers and formation of various tissues and organs
23PG2Z6	Lab Course in Cell Biology and Developmental Biology	CO 1 Identify various stages in mitosis and meiosis. CO 2 Detection of polytene chromosome in salivary gland cells of the larvae of the Chironomus CO 3 Organize the steps in isolation of genomic DNA and RNA

		CO 4 Analyse the steps and principles involved in Agarose gel electrophoresis and SDS-Polyacrylamide gel electrophoresis techniques. CO 5 Analyse the various developmental stages in Chick embryo
23PG2ZE5 (Elective 3)	Economic Entomology	CO 1 Understand taxonomy, classification and life of insects in the animal kingdom. CO 2 Know the life cycle, rearing and management of diseases of beneficial insects. CO 3 Know the type of harmful insects, life cycle, damage potential and management of pests including natural pest control CO 4 Recognize insects which act as vectors causing diseases in animals and human. CO 5 Overall understanding on the importance of insects in human life.
23PG2ZE6	Microbiology	CO 1 Describe the scope of microbiology, taxonomical classification, principle and components of different types of microscopes CO 2 Classify bacteria based on morphology, biochemical characteristics and growth parameters CO 3 Discuss the morphology and classification of viruses. CO 4 Explain the metabolism of bacteria CO 5 Appraise the role of bacteria in food, industry, medicine, environment and agricultural microbiology

23PG2ZE7	Research Methodology	CO 1 To understand the implications of GLP CO 2 To learn the working principles of different instruments CO 3 To gain the knowledge on techniques of histology and histochemistry CO 4 To acquire knowledge on the basic principle and application of various modules of light and electron microscopy CO 5 To analyse the applications of tracer techniques and animal cell culture techniques
23PG2ZE8	Biophysics	CO 1 Classify the chemical bonds and forces interacting between molecules and Determine the theories involved in acidity and basicity CO 2 Apply the principles of Thermodynamics and biological oxidation in living organisms CO 3 Determine the principle, procedure, components involved and biological applications of Instruments CO 4 Analyse the principle, properties, instrumentation and biological applications of Electromagnetic radiation CO 5 Assess the principles of Photobiology in the Biophysical aspects of Vision and neurophysiology applied to the Animals
23PG2ZSE (SEC-EDC)	Poultry Farming	CO 1 To understand the various practices in Poultry farming. To know the needs for Poultry farming and the status of India in global market. CO 2 To be able to apply the techniques and practices needed or Poultry farming.

		CO 3To know the difficulties in Poultry farming and be able to propose plans against it. CO 4To understand the various practices in Poultry farming. To know the needs for Poultry farming and the status of India in global market. CO 5To be able to apply the techniques and practices needed or Poultry farming.
Off Class	SPSS	CO 1Apply the knowledge of research to frame the questionnaire based on hypothesis CO 2Organize the data in the form of Chart and diagrams using SPSS CO 3Analyze the data using descriptive statistics, T test, correlation and regression CO 4Demonstrate ANOVA and Hierarchical Clustering using SPSS software CO 5Interpret the results obtained through SPSS analysis tools
19PG3Z11	Biophysics	CO 1 Classify the chemical bonds and forces interacting between molecules and Determine the theories involved in acidity and basicity CO 2 Apply the principles of Thermodynamics and biological oxidation in living organisms CO 3 Determine the principle, procedure, components involved and biological applications of Instruments CO 4 Analyse the principle, properties, instrumentation and

		biological applications ofElectromagnetic radiation CO 5 Assess the principles of Photobiology in the Biophysical aspects of Vision and Neurophysiologyapplied to the Animals
19PG3Z12	Immunology	CO 1 Summarize the overview of the immune system CO 2 Elaborate the structure and properties of antigen and antibody and its interactions. CO 3 Determine the concept of MHC molecules and maturation and activation of lymphocyte. CO 4 Analyze the complement system and the types of hypersensitivity reactions. CO 5 Prioritize the types of vaccines and immunity in health and disease.
19 PG3Z13	Biostatistics & Research Methodology	CO 1 Organise the research data in appropriate order and apply the measures of central tendency and dispersion values. CO 2 Assess the difference between the expected and observed frequencies by Chi-Square test for testing of hypothesis CO 3 Compute degrees of relationship variables using Correlation and Regression analysis. CO 4 Examine the Concepts of Research and devise the Research Hypothesis CO5 Paraphrase the research work through documentation as a Thesis, Oral or Poster Presentation.

19PG3ZE1	Fisheries &Aquaculture	CO 1 Identify the economically important fishes and fishery products. CO 2 Plans according to the recent concepts in fisheries management. CO 3 Distinguish the various aquaculture systems. CO 4 Organizes the type of hatchery, brood stock, larval production, feed management water quality and disease management in cultivable species, live feed production. CO 5 Evaluates the Fisheries and Aquaculture Practices in India.
19PG3ZE2	Bioinformatics	CO 1 Summarize the Human Genome Project, shotgun sequencing, web browsers and search engines and flat file of biological databases. CO 2 Explain DOTPLOT , dynamic programming using Needleman-Wunsch Algorithm and development in significance of substitution matrices CO 3 Make use of different PAM and BLOSUM for closely and distantly related sequences, Multiple sequence alignment CO 4 Examine Model Phylogenetic tree based on the distance matrix CO 5 Determine the secondary structure and three-dimensional structure prediction methods
19PG3Z14	Lab in Biophysics & Biostatistics	CO 1 Recall the principle of centrifuge, pH meter, Chromatography CO 2 Determine the maximum absorption and its molar extinction coefficient of sample CO 3 Estimate the pH Titration curve, Surface tension and viscosity

		of sample CO 4 Interpret the results for statistical analysis including mean, median, mode and Standard deviation for individual, continuous series CO 5 Determine the correlation, regression and significance for the statistical data
19PG3 Z15	Lab in Immunology, Fisheries & Aquacultureand Bioinformatics	CO 1Explain the different lymphoid organs,properties of soluble and particulate antigen CO 2Estimate the lymphocytes from peripheral blood and explain the biological databases NCBI CO 3Construct various bleeding techniques and separation of serum and plasma and plan a visit to aquarium. CO 4 Examine the experiment with complement mediated lysis, Immunoelectrophoresis and rocket immunoelectrophoresis identification and single / double immunodiffusion CO 5 Analyze the sequences BLAST AND ClustalO and Assess the formation of perciptin line and button formation
19PG4Z16	Environmental Biology	CO 1Develop an understanding of ecological key interactions and processes CO 2 Explain the factors involved in determining population size, Density, Distribution &Community function CO 3 Analyze sustainable utilization of natural resources

		CO 4 Agree significance of Biodiversity, consequences on loss of Biodiversity& conservation Strategies CO 5 Criticize various kinds of pollution in the environment, their impact on the ecosystem & impact of climatic change
19PG4Z17	Biotechnology	CO 1Find the enzymes in rDNA technology CO 2Compare the cloning vehicles with their specific advantages CO 3Criticize the boon technology of *in-vitro* fertilization CO 4 Analyse the technique of tissue culture CO 5 Identify the importance of artificial blood
19PG4Z18	Developmental Biology	CO 1 Recalls the basic concepts of Developmental Biology. CO 2 Explain how fertilization, cleavage and Gastrulation occur. CO 3Compares the basic concepts of organogenesis in differentorganisms. CO 4Understand the development of egg into a foetus, then intoadult. CO 5 Associate the embryo development with Phylogeny.
19PG4ZE3	Economic Zoology	CO 1 Compare the morphological adaptation in bees in relation to their social behaviour CO 2 Plan for a sericulture unit as a cottage industry. CO 3 Analyse the rearing methods of prawn and pearl oysters. CO 4 Summarize the rearing methods of chick. CO 5 Assess the commercial importance of dairy farm
19PG4ZE4	Ethology	CO 1 Classify different patterns of genetic, environmental, neural and hormonal animal behaviour

		CO 2 Explains the role of visual, auditory communication with respect to learning and instincts mechanism CO 3 Discuss the various reproductive and social behaviours in context to pair selection. CO 4 Summarizes the ecological condition such as hunger, thirst, territories etc., in influencing the animal behaviour. CO 5 Elaborate the molecular regulation of circadian rhythm
19PG4Z19	Lab in Environmental Biology & Developmental Biology	CO 1 Find the primary productivity CO2 Demonstrate the estimation of various components of soil and water. CO 3 Identify the zoo planktons in water sample. CO 4 Analyse the various developmental stages of chick embryo CO 5 Compare the diversity of species by quadrat method.
19PG4Z20	Lab in Biotechnology, Economic Zoology & Ethology	CO 1Demonstrate the plant tissue culture technique. CO 2 Experiment with DNA isolation CO 3 Estimate DNA quantitatively CO 4 Analyse Newton's bee hive CO 5 Relate nest building in different birds