

FATIMA COLLEGE

(Autonomous)

Affiliated to Madurai Kamaraj University

Re-Accredited with 'A++' by NAAC (Cycle - IV)

Mary Land, Madurai - 625018, Tamil Nadu

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.



FATIMA COLLEGE

(Autonomous)

Affiliated to Madurai Kamaraj University
Re-Accredited with 'A++' by NAAC (Cycle - IV)
Mary Land, Madurai - 625018, Tamil Nadu

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.

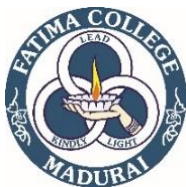


FATIMA COLLEGE

(Autonomous)

Affiliated to Madurai Kamaraj University
Re-Accredited with 'A++' by NAAC (Cycle - IV)
Mary Land, Madurai - 625018, Tamil Nadu

		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,



FATIMA COLLEGE

(Autonomous)

Affiliated to Madurai Kamaraj University
Re-Accredited with 'A++' by NAAC (Cycle - IV)
Mary Land, Madurai - 625018, Tamil Nadu

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



FATIMA COLLEGE

(Autonomous)

Affiliated to Madurai Kamaraj University
Re-Accredited with 'A++' by NAAC (Cycle - IV)
Mary Land, Madurai - 625018, Tamil Nadu

		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



FATIMA COLLEGE

(Autonomous)

Affiliated to Madurai Kamaraj University
Re-Accredited with 'A++' by NAAC (Cycle - IV)
Mary Land, Madurai - 625018, Tamil Nadu

		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

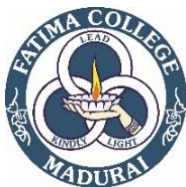


FATIMA COLLEGE

(Autonomous)

Affiliated to Madurai Kamaraj University
Re-Accredited with 'A++' by NAAC (Cycle - IV)
Mary Land, Madurai - 625018, Tamil Nadu

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.



FATIMA COLLEGE

(Autonomous)

Affiliated to Madurai Kamaraj University
Re-Accredited with 'A++' by NAAC (Cycle - IV)
Mary Land, Madurai - 625018, Tamil Nadu

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



FATIMA COLLEGE

(Autonomous)

Affiliated to Madurai Kamaraj University
Re-Accredited with 'A++' by NAAC (Cycle - IV)
Mary Land, Madurai - 625018, Tamil Nadu

		biological applications of Electromagnetic radiation CO 5 Assess the principles of Photobiology in the Biophysical aspects of Vision and Neurophysiology applied 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.



FATIMA COLLEGE

(Autonomous)

Affiliated to Madurai Kamaraj University
Re-Accredited with 'A++' by NAAC (Cycle - IV)
Mary Land, Madurai - 625018, Tamil Nadu

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

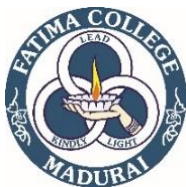


FATIMA COLLEGE

(Autonomous)

Affiliated to Madurai Kamaraj University
Re-Accredited with 'A++' by NAAC (Cycle - IV)
Mary Land, Madurai - 625018, Tamil Nadu

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



FATIMA COLLEGE

(Autonomous)

Affiliated to Madurai Kamaraj University
Re-Accredited with 'A++' by NAAC (Cycle - IV)
Mary Land, Madurai - 625018, Tamil Nadu

		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 1 Find the enzymes in rDNA technology CO 2 Compare the cloning vehicles with their specific advantages CO 3 Criticize the boon technology of <i>in-vitro</i> 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 3 Compares the basic concepts of organogenesis in different organisms. CO 4 Understand the development of egg into a foetus, then into adult. 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



FATIMA COLLEGE

(Autonomous)

Affiliated to Madurai Kamaraj University
Re-Accredited with 'A++' by NAAC (Cycle - IV)
Mary Land, Madurai - 625018, Tamil Nadu

		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 1 Demonstrate 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