FATIMA COLLEGE (AUTONOMOUS), MADURAI – 625018
2020 - 2021

NAME OF THE PROGRAMME: M.SC., ZOOLOGY **PROGRAMME CODE : PSZO**

PROGRAMME OUTCOMES (PO)

On completion (after two years) of M. Sc ZOOLOGY, the graduates would be able to

PO 1	Acquire knowledge in the fundamentals concepts in Zoology and understand the complex interactions existing among various living organisms
PO 2	Analyse the interrelationship among various organisms and their relationship with their environment
PO 3	Develop the scientific temperament to carry out research project with professional ethics.
PO 4	Apply the knowledge and skills to take up entrepreneurship in the field of Apiculture, Sericulture, Fisheries, Dairy farming and Poultry.

PO 5	Enable the students to seek employability in academic, research institutions, state and central government sectors, bio-based and allied industrial sectors

PROGRAMME SPECIFIC OUTCOMES (PSO)

PSO 1	Gain comprehensive knowledge in different branches of zoology – Cell & Molecular Biology, Biochemistry, Microbiology, Developmental Biology, Immunology, Genetics, Biotechnology, Bioinformatics and Evolution.
PSO 2	Interrelate the concepts of gene, genome, cell, tissue, organ and organ-system in the physiological adaptations, development, reproduction, behaviour of microbes, plants and animals
PSO 3	Perform experiments in the field of Microbiology, Biochemistry, Cell & Molecular Biology, Environmental Biology, Developmental Biology, Biostatistics, Immunology, Genetics, Biotechnology and Bioinformatics.
PSO 4	Develop empathy towards conservation of plants and animals and appreciate the diversity of animals and their inclusiveness in the sustenance of an ecosystem.

PSO 5	Express ideas and concept through oral presentation and organize research data in the form of dissertation writing.
PSO 6	Solve the environmental, social and ethical problems by applying the biological principles for minimizing pollutants by waste water treatment and solid waste management for eco-sustainable development.
PSO 7	Address the local, regional, national and global environmental issues and mitigating the same through Intervention strategies adopting standard protocol.
PSO 8	Practice judicious way of using animals in experiments, proper disposal of hazardous biological waste and ethics related to conserving endangered animals and plants.
PSO 9	Exhibit the holistic growth by developing interpersonal skills, subject proficiency, and to seek employability in clinical laboratory, Research institutions, Medical coding and IT companies.
PSO10	Make them self employed/ Entrepreneur in the field of Sericulture, Fisheries and Aquaculture, Dairy farming, Apiculture and Poultry.

PSO11	Use of computers for Power point presentation, Virtual Dissection, analysis of bio- molecules using bioinformatics software and computing biological data.
PSO12	Healthy diet pattern for combat life style disorder.

COURSE CODE	COURSE TITLE	COURSE OUTCOMES
19PG1Z1	Animal Diversity	CO 1 Recall the levels of organization among Invertebrates and Chordates. CO 2 Bring out the General characters of Invertebrates. CO 3 Classify the Phyla of Invertebrates and Chordates up to class level. CO 4 Distinguish between Invertebrates and Chordates. CO 5 Predict the systematic Position of Animals.

19PG1Z2	Microbiology	CO 1 Describe the scope of microbiology, taxonomical classification, principle and components of different types of microscope CO 2 Classify bacteria based on morphology, biochemical characteristics and growth parameters CO 3 Discuss the morphology, classification and cultivation of viruses. CO 4 Explain the microbial genetics and metabolism of bacteria CO 5 Appraise the role of bacteria in food, industry, medicine, environment and agricultural microbiology
19PG1Z3	Cell & Molecular Biology	CO 1 Explain the ultrastructure and functions of Cytoskeletons and Plasma membrane CO 2 Discuss the complexity of eukaryotic genome organization and its replication in Prokaryotes & Eukaryotes CO 3 Describe the process of transcription and post transcriptional modification in Eukaryotes

		CO 4 Evaluate the regulation of transcription and translation in Prokaryotes & Eukaryotes CO 5 Assess the events of cell cycle, cell signalling pathways, cell death and cancer
19PG1Z4	Lab In Animal Diversity & Microbiology	CO 1 Identify the diversity of animals. CO 2 Explain the fundamental organization of cells. CO 3 Prepare different types of media. CO 4 Demonstrate bacterial isolation technique and maintain pure culture. CO 5 Identify unknown bacteria by biochemical testing.

19PG1Z5	Lab In Cell & Molecular Biology	CO 1 Classify and sketch the various microscopy CO 2 Estimate the quantity of DNA and RNA CO 3 Infer the qualitative estimation of DNA and RNA CO 4 Organize the steps in isolation of genomic DNA CO 5 Interpret the mitotic stages of onion root tip
19PGZEDC1	Herbal Medicine	CO 1 Make use of alternative medicinal methods. CO 2 Outline the importance of herbs used in day today life. CO 3 Categorize the usage of herbs for different ailments. CO 4 Solve the life style disorders with food supplements. CO 5 Prepare various herbal products.

19PG2Z6	Genetics	CO1 Classify the pattern of inheritance of traits by various crosses. CO2 Identify the pattern of sex determination in various organisms. CO3 Analyse the mechanism of crossing over and linkage CO4 Determine the types of variation in chromosome. CO5 Assess the process of bacterial recombination in microbial genetics.
19PG2Z7	Evolution	CO1 Outline the origin and evolution of life CO2 Categorize the evidences and theories of organic evolution CO3 Describe the mechanism of evolution CO4 Write about the natural selection and speciation CO5 Explain the molecular and human evolution
19PG2Z8	Biochemistry	CO 1 Analyse the metabolic pathways of carbohydrates

		CO 2 Recall the structure, properties and metabolism of amino acids and Protein. CO 3 Assess the structure, properties and metabolism of Lipids CO 4 Identify the structural organization and metabolism of Nucleic Acids. CO 5 Describe the mechanism of enzyme and hormone action.
19PG2Z9	Lab in Genetics & Evolution	CO 1 Determine the sex in man by Barr bodies. CO 2 Experiment with the simple mendelian traits. CO 3 Examine the process of Sex determination in man and fruit fly. CO 4 Construct the Pedigree charts by systematic listing of parents. CO 5 Relate the genotypic frequencies by Hardy-Weinberg equilibrium.
19PG2Z10	Lab in Biochemistry	CO 1: Find appropriate skills in handling basic equipment

		CO 2: Trace the strength of unknown solutions using formula to find the value CO 3: Estimate the various biomolecules using standard protocols and Design experiments to solve research problems CO 4: Apply the principles and procedures to demonstrate the experiments CO 5: Assess the experiments with the data arrived and interpret the results
19PGZEDC2	Herbal Medicine	CO 1 Make use of alternative medicinal methods. CO 2 Infer the importance of herbs used in day today life. CO 3 Categorize the usage of herbs for different ailments. CO 4 Solve the life style disorders with food supplements. CO 5 Prepare various herbal products.

Off Class	SPSS	CO 1 Apply the knowledge of research to frame the questionnaire based on hypothesis CO 2 Organize the data in the form of Chart and diagrams using SPSS CO 3 Analyze the data using descriptive statistics, T test, correlation and regression CO 4 Demonstrate ANOVA and Hierarchical Clustering using SPSS software CO 5 Interpret 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 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 CO 5: 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

19PG3Z15	Lab in Immunology, Fisheries & Aquaculture and Bioinformatics	CO 1: Explain the different lymphoid organs, properties of soluble and particulate antigen CO 2: Estimate the lymphocytes from peripheral blood and explain the biological databases NCBI CO 3: Construct various bleeding techniques and separation of serum and plasma and plan a visit to aquarium. CO 4: Examine the experiment with complement mediated lysis, Immune electrophoretic and rocket immunoelectrophoretic identification and single / double immunodiffusion CO 5: Analyze the sequences BLAST AND Claustral O and Assess the formation of precipitin line and button formation
19PG4Z16	Environmental Biology	CO 1: Develop an understanding of ecological key interactions and processes CO 2: Explain the factors involved in determining population size, Density, Distribution &Community function

		CO 3: Analyse 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 1: Find the enzymes in rDNA technology CO 2: Compare the cloning vehicles with their specific advantages CO 3: Criticize 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 3 Compares the basic concepts of organogenesis in different organisms.

		CO 4 Understand the development of egg into a fetus, 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 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 CO 2 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