



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: B.Sc. ZOOLOGY

Programme Code: UAZO

Programme Outcomes:

PO 1	Apply acquired scientific knowledge to solve complex issues.
PO 2	Attain Analytical skills to solve complex cultural, societal and environmental issues.
PO 3	Employ latest and updated tools and technologies to analyse complex issue.
PO 4	Demonstrated Professional Ethics that foster Community, Nation and Environment Building Initiatives.
PO 5	Apply the knowledge and skill to take up higher education, entrepreneurship and employment in government and private sectors.



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Course Outcomes:

Course Code	Course Title	Course Outcomes
23Z1CC1	Invertebrata	<p>CO 1 Understand the basic concepts of invertebrate animals and recall its structure and functions.</p> <p>CO 2 Illustrate and examine the systemic and functional morphology of various groups of invertebrata.</p> <p>CO 3 Differentiate and classify the animal's mode of life in various taxa and estimate the biodiversity.</p> <p>CO 4 To compare and distinguish the various physiological processes and organ systems in lower animals.</p> <p>CO 5 Infer and integrate the parasitic and economic importance of invertebrate animals.</p>
23Z1CC2	Invertebrata Lab Course	<p>CO 1 Identify and label the external features of different groups of invertebrate animals.</p> <p>CO 2 Illustrate and examine the circulatory system, nervous system and reproductive system of invertebrate animals.</p> <p>CO 3 Differentiate and compare the structure, function and mode of life of various groups of animals.</p> <p>CO 4 To compare and distinguish the dissected internal organs of lower animals.</p>



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		CO 5 Prepare and develop the mounting procedure of economically important invertebrates.
23Z1SE1	Ornamental Fish Farming & Management	<p>CO 1 To recall the basic concepts, Scope and importance of ornamental fish culture</p> <p>CO 2 The students will be able to identify, culture, maintain and market the commercially important ornamental fishes.</p> <p>CO 3 Explain the process of food preparation.</p> <p>CO 4 Identify the symptoms of various diseases prevalent in aquarium fishes.</p> <p>CO 5 To analyze the knowledge and skills gained on the different aspects of ornamental fish keeping will enable the students to develop entrepreneurship potential and help in self-employment.</p>
23Z1FC	Fundamentals of Biology	<p>CO 1 Recall the biological significance of biomolecules</p> <p>CO 2 Illustrate the structure and functions of cell and its organelles</p> <p>CO 3 Determine the concept of molecular biology and heredity.</p> <p>CO 4 Correlate the different life processes of human</p> <p>CO 5 Infer the concepts of ecology and evolution</p>
23Z2CC3	Chordata	<p>CO 1 Classify, Identify and recall the name and distinct features of different subphylum belonging to phylum Chordata.</p> <p>CO 2 Explain, and relate the origin, structural organization and</p>



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		<p>evolutionary aspects of vertebrates.</p> <p>CO 3 Analyze, compare and distinguish the developmental stages and describe the important biological process.</p> <p>CO 4 Correlate the different modes of life and parental care among different vertebrates.</p> <p>CO 5 Summarise the morphology and ecological adaptations in vertebrates and list out the economic importance.</p>
23Z2CC4	Chordata Lab Course	<p>CO 1 Identify and label the external features of different groups Chordate animals.</p> <p>CO 2 Illustrate and examine the circulatory system, nervous system and reproductive system of Chordate animals.</p> <p>CO 3 Differentiate and compare the structure, function and mode of life of various groups of animals.</p> <p>CO 4 To compare and distinguish the dissected internal organs of lower animals.</p> <p>CO 5 Prepare and develop the mounting procedure of economically important Chordate</p>
23Z2SE2	Bio composting For Entrepreneurs hip	<p>CO 1 To understand the basic concepts and process of biocomposting</p> <p>CO 2 To demonstrate biocomposting techniques for various end applications like solid waste management, industrial waste recycling using sugarcane bagasse, etc..</p>



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		CO 3 To foster the skills on the preparation of quality biocompost by recycling the waste CO 4 To infer and integrate the applications of biocompost CO 5 To design and estimate the economic cost of establishing small Biocompost units as a cottage industry.
23Z2SE3	Aquarium Keeping	CO 1 List the types of aquarium. CO 2 Identify the exotic and endemic varieties of ornamental fishes. CO 3 Outline the physico – chemical parameters in setting and management of aquarium Farm. CO 4 Explain the techniques followed in feeding, handling and transport of ornamental fish. CO 5 Identify the common freshwater and marine ornamental fishes based on common characters and sexual dimorphism.
19Z3CC7	Human Physiology	CO 1 Associate the basic components and functions of the digestive system and their diseases. CO 2 Organise structure and functions of the respiratory and circulatory system and their diseases. CO 3 Recognize the organs and functions of urinogenital system and their disease. CO 4 Identify the organs, theories and functions of neuromuscular system and their diseases.



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		CO 5 Analyze the structure and functions of Endocrine glands and sense organs and their disorder.
19Z3CC8	Environmental Biology	CO 1 Paraphrase the structure and function of the Ecosystems CO 2 Identify the characteristics of a population and their interactions. CO3 Categorize community characteristics and value natural resources. C04 Recognize the importance of Biodiversity and its conservation. CO5 Show the consequences of Human actions on global environment.
19Z3CC9	Lab- Human Physiology & Environmental Biology	CO 1 Associate the effect of pH and temperature on salivary amylase activity in man. CO 2 Infer the qualitative analysis and estimation of biomolecules. CO 3 Compare the preparation of haemin and haemochromogen crystals. CO 4 Determine the amount of dissolved oxygen and carbon dioxide in the given water samples. CO 5 Prepare the models for food chain and food web in different ecosystem and identification of spotters.



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19Z3SB1	Vermitechnology	<p>CO1 Identify the different species of earthworm and elucidate the biology of earthworms</p> <p>CO2 Classify the ecological group of earthworms and discuss the role of earthworm in diverse applications.</p> <p>CO3 Organize the methods of Vermicomposting and identify factors affecting vermicompost.</p> <p>CO4 Analyse the physical, chemical and biological properties and maintenance of vermicompost.</p> <p>CO5 Examine the economics and prospects of vermiculture as self – employment avenues.</p>
19Z3ACQ1	Plant Diversity & Pathology	<p>CO 1 Recognize the structure, life cycle and economic importance of Algae & Fungi.</p> <p>CO 2 Identify the plant diseases & control methods and Lifecycle & uses of Lichens</p> <p>CO 3 Show general characters & life cycle of Bryophytes, Pteridophytes and Gymnosperms</p> <p>CO 4 Classify the Angiosperms & list their uses</p> <p>CO 5 Relate the plants to their economic uses</p>
19Z3ACQ2	Lab- Plant Diversity & Pathology	<p>CO1 Construct suitable micro preparations</p> <p>CO2 Construct sections of given plant materials with illustration and description</p>



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		<p>CO3 Make use of dissection microscope to display the floral parts of Angiosperms</p> <p>CO4 Identify specimens and slides from Algae, Fungi, Lichens, Bryophytes, Pteridophytes and Gymnosperms included in the syllabus</p> <p>CO5 Identify the economically useful plants</p>
19C3ACZ1	Animal Diversity, Physiology & Genetics	<p>CO 1 Outline the general characters with of invertebrate and chordata with reference to organization, symmetry, body cavity</p> <p>CO 2 Explain the digestive system, role of enzymes, digestion and absorption of Carbohydrates, Protein and Fat in Man.</p> <p>CO 3 Distinguish between internal and external respiration in context to the mode and transport of gas exchange.</p> <p>CO 4 Summarize the structure and function of heart, Kidney, eye and ear.</p> <p>CO 5 Explain the Mendelian Laws Of Inheritance & Allelism</p>
19C3ACZ2	Lab- Animal Diversity, Physiology & Genetics	<p>CO 1 Outline the Laboratory biosafety guidelines and good laboratory practices.</p> <p>CO 2 Dissect and mount the Body setae of Earthworm</p> <p>CO 3 List out the features of the given spotters <i>Amoeba</i>, <i>Taenia solium</i>, <i>Nereis</i>, <i>Amphioxus</i> (entire), <i>Anguilla</i> (Eel), Toad (<i>Bufo</i>), Cobra,</p>



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		<p>Chamaeleon, Pigeon and various Syndromes.</p> <p>CO 4 Choose the appropriate qualitative test for the analysis of carbohydrates, proteins, lipids, urea and uric acid in the given sample</p> <p>CO 5 Illustrate the structure of human ear, eye and heart.</p>
19Z4CC10	Microbiology	<p>CO 1 Examine the culturing methods and phenotypic identification of microbes</p> <p>CO 2 Examine the taxonomical classification, reproduction and genetic recombination in bacteria</p> <p>CO 3 Elaborate the morphologic properties and cultivation of viruses.</p> <p>CO 4 Determine the role of microbes in the environment.</p> <p>CO 5 Correlate the technology of fermentation with the microbial production industrial products</p>
19Z4CC11	Evolution	<p>CO 1 Recognize the basic concepts of origin of life and evidences of evolution.</p> <p>CO 2 Paraphrase the theories of evolution</p> <p>CO 3 Examine the Modern synthetic theory and the factors causing variation.</p> <p>CO 4 Organize the types and salient features of natural selection and mimicry.</p> <p>CO 5 Interpret the concept of speciation and human evolution</p>



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19Z4CC12	Lab- Microbiology & Evolution	CO 1 Find the working Principle and Applications of instruments. CO 2 Demonstrate the microbiological techniques and water quality analysis CO 3 Identify the animals of evolutionary importance, adaptive coloration and in mimicry. CO 4 Identify the morphological evidences and the horse and human evolution model. CO 5 Analyze the Hardy – Weinberg equilibrium using beads.
19Z4SB2	Mushroom Cultivation	CO 1 State the prospects of mushroom cultivation CO 2 Devise a plan for mushroom production unit CO 3 Outline the techniques in cultivation, grading & processing of edible mushrooms CO 4 Identify and manage Insect-Pests and diseases affecting mushrooms. CO 5 Prepare a business plan for small scale enterprise
19Z4ACQ3	Developmental Botany & Plant Breeding	CO1 Recall structure & functions of various plant tissue CO2 Paraphrase the mechanism of transpiration, photosynthesis, respiration & plant growth regulators CO3 Identify the structure & development Embryology of plant



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		CO4 Examine techniques in the crop improvement programmes CO 5 Plan a home garden using horticultural techniques
19Z4ACQ4	Lab- Developmental Botany & Plant Breeding	CO1 Illustrate the anatomy of Monocot and dicot stem , root and leaf CO2 Interpret experimental set ups in plant physiology CO3 Apply the horticultural techniques of Cuttage and layerage CO4 Make use of emasculation technique CO5 Identify specimens and slides from Plant anatomy, Physiology, Embryology , Plant Breeding & Horticulture included in the syllabus.
19C4ACZ3	Cell & Molecular Biology	CO 1 Outline the general structure and function of a prokaryotic and eukaryotic cell. CO 2 Associate the structure and function of plasma membrane, mitochondria and endoplasmic reticulum CO 3 Summarize the structure of chromosome CO 4 Recall the structure and replication of DNA CO 5 Organize the events in translation, transcription and gene regulation in Prokaryotes
19C4ACZ4	Lab- Cell & Molecular Biology	CO 1 Identify the squamous epithelial cells Under microscope CO 2 Dissect and mount the Polytene Chromosomes in the Salivary gland of <i>Chironomus</i> larva.



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		<p>CO 3 Interpret the mitotic stages from the squash preparation in Onion root tip</p> <p>CO 4 Recognize the features of the given spotters: Stages of Meiosis, Cellular organelles – Mitochondria, Endoplasmic reticulum, Golgi complex, Nucleus</p> <p>CO 5 Recall the structure and replication of DNA</p>
19Z5CC13	Fundamentals of Biochemistry	<p>CO 1 Describe the structural, properties, biological significance of carbohydrates, proteins and lipids.</p> <p>CO 2 Classify lipids based on their complexity</p> <p>CO 3 Classify amino acids and proteins based on their structure</p> <p>CO 4 Construct the flow chart to highlight the metabolic pathways of carbohydrates, proteins and lipids.</p> <p>CO5 List down the factors affecting the normal functions of the enzymes and biological functions of the vitamins.</p>
19Z5CC14	Molecular Biology	<p>CO 1 Illustrate the Watson and Crick model of DNA double helix; mechanism of DNA replication and the role of enzymes</p> <p>CO 2 Discuss the different types of DNA damages and repair mechanisms</p> <p>CO 3 Describe the transcription and translation in prokaryotes and eukaryotes</p>



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		CO 4 Discuss the post-transcriptional modifications, properties of genetic code and role of repressor in gene regulation CO 5 Employ the appropriate separation technique based on the size, shape, and charge of biomolecules
19Z5CC15	Lab- Biochemical Analysis	CO 1 Make use of the knowledge of basic principles of Biochemistry to carry out the biochemical experiments CO 2 Infer the outcome of the qualitative analytical tests of Biomolecules CO 3 Estimate the biomolecules using standard protocols CO 4 Develop skills in handling basic equipments CO 5 Develop familiarity with the principles of Laboratory safety
19Z5CC16	Lab- Molecular Biology	CO 1 Estimate the pH of different samples CO 2 Infer the color changes in DNA and RNA estimation CO 3 Compute the R _f value for paper chromatography CO 4 Demonstrate the genomic DNA isolation, DNA estimation and chromatography CO 5 Solve the presence of nucleic acid in the given sample
19Z5ME1	Biostatistics	CO 1 Outline the importance of data collection and its types. CO 2 Estimate and interpret the data, by various measures including mean, median, and standard deviation.



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		<p>CO 3 Apply the basic numeric and graphical techniques to display and summarize the collected data.</p> <p>CO 4 Interpret statistical results effectively in context to Correlation and Regression.</p> <p>CO 5 Choose and apply appropriate statistical methods for analyzing one or two variables.</p>
19Z5ME2	Animal Behaviour	<p>CO 1 Outline the scope and history of Ethology</p> <p>CO 2 Explain the types of learning</p> <p>CO 3 Summarize the methods adopted by the animals in mate selection.</p> <p>CO 4 Discuss the various parameters controlling the behaviour in context to nerve and hormone</p> <p>CO 5 Recall the types and features of biological rhythm</p>
19Z5SB3	Ornamental Fish Culture	<p>CO 1 List the types of aquarium.</p> <p>CO 2 Plan the use of common aquarium ornamental fish and aquatic plants to decorate it.</p> <p>CO 3 Outline the physico – chemical parameters of water required for the growth of fish.</p> <p>CO 4 Explain the techniques followed in ornamental fish breeding.</p> <p>CO 5 Identify the symptoms of various diseases prevalent in ornamental fish.</p>



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19Z5SB4	Sericulture	<p>CO 1 List the importance of sericulture as cottage industry and the support provided by Central Silk Board.</p> <p>CO 2 Explain the different methods of vegetative propagation followed in mulberry cultivation.</p> <p>CO 3 Outline the life cycle of mulberry silkworm and the methods of rearing.</p> <p>CO 4 Organize the steps involved in processing of silk and its marketing.</p> <p>CO 5 Find various diseases that affect silkworm and cocoon formation</p>
19Z6CC17	Basic Immunology	<p>CO 1 Outline the types of immunity, immunization and origin of immune cells</p> <p>CO 2 Explain the structure and properties of antigen and antibody</p> <p>CO 3 Identify the antigen and antibody interactions and the steps involved in the immunological techniques</p> <p>CO 4 Illustrate the types and mechanism of immune response and events in hybridoma technology</p> <p>CO 5 Describe the types of hypersensitivity reactions and autoimmune diseases</p>
19Z6CC18	Principles of Biotechnology	<p>CO 1 Identify the principles and applications of Biotechnology biosafety guidelines and IPR for the benefit of mankind</p>



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		<p>CO 2 Discuss the tools and Techniques to manipulate DNA using rDNA technology for the development of transgenic plants, animals, and microbes or products for specific use</p> <p>CO 3 Describe basic techniques in animal cell culture and the application of stem cell production.</p> <p>CO 4 Summarize the biotechnology products and applications in the healthcare products, medicine, agriculture</p> <p>CO 5 Analyse the appropriate technology and application of biotechnology in industry and environmental sectors to increase SCP production and sewage management.</p>
19Z6CC19	Lab- Immunology	<p>CO 1 Relate the knowledge of basic principles of immunology to carry out the related experiments</p> <p>CO 2 Acquire skills in handling basic equipments</p> <p>CO 3 Infer the outcome of the experiments of Immunology</p> <p>CO 4 Relate the biochemical properties of Glucose, Albumin & Ketone bodies while performing the qualitative analytical tests for their detection in urine sample</p> <p>CO 5 Develop familiarity with the principles of Laboratory safety</p>
19Z6CC20	Lab- Biotechnology	<p>CO 1 Acquire skills in handling basic equipments</p> <p>CO 2 Identify the insects</p> <p>CO 3 Estimate the various biomolecules using standard protocols</p>



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		<p>CO 4 Identify and comment on the spotters Agarose gel electrophoresis, SDS-PAGE, pBR322, Spirulina and Insulin and Bioinformatics tools</p> <p>CO 5 Examine the features in mouth parts of Cockroach & Honey bee, Pests of Agricultural Importance – Rice Weevil, Rhinoceros Beetle</p>
19Z6ME3	Embryology	<p>CO 1 Recall the basic concepts of developmental biology.</p> <p>CO 2 Tell how fertilization, cleavage and gastrulating occur.</p> <p>CO 3 Compare the basic concepts of organogenesis in different organisms.</p> <p>CO 4 Relate the development of egg into a foetus, then into adult, among Vertebrates.</p> <p>CO 5 Associate the embryo development with Phylogeny.</p>
19Z6ME4	Clinical Laboratory Technique	<p>CO 1 List the different sterilization methods followed in clinical laboratory.</p> <p>CO 2 Explain the collection method and techniques used in laboratory for urine analysis.</p> <p>CO 3 Outline the method of blood collection and related analysis.</p> <p>CO 4 Find the way to process clinical specimens safely according to established procedures.</p> <p>CO 5 Utilize the knowledge of karyotyping in detection of congenital</p>



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		malformations.
19Z6ME5	Bioinformatics	<p>CO 1 Enumerate the applications of bioinformatics, web browsers and search engines and biological databases</p> <p>CO 2 Describe the flat file of UniProtKB, secondary and tertiary structure prediction</p> <p>CO 3 Employ the appropriate substitution matrices and global and local alignment and BLAST</p> <p>CO 4 Summarize the methods of multiple sequence alignment and phylogenetic tree</p> <p>CO 5 Compute and develop Ramachandran plot and protein structure prediction</p>
19Z6ME6	Entomology	<p>CO 1 List the different methods of insect collection.</p> <p>CO 2 Find the morphological modifications of insects with different functions.</p> <p>CO 3 Summarize the beneficial aspects of insects. Lect</p> <p>CO 4 Explain the harmful effects of insects.</p> <p>CO 5 Identify the agricultural pests and the economic damage caused.</p>
19Z6SB5	Apiculture	<p>CO 1 Explain the scope of apiculture in India</p> <p>CO 2 Recall the structure of honey bee</p>



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		CO 3 List the equipments used in bee keeping CO 4 Explain the extraction, Preservation and storage of honey CO 5 Outline the types of bee diseases
19Z6SB6	Dairy Farming	CO 1 Identify the features of various indigenous and exotic breeds of dairy cattles. CO 2 Discuss the management of new born calf, Heifer and milk cow. CO 3 Summarize the significance of Pasteurization in the preservation of the nutritive value of milk. CO 4 Develop an idea regarding the formulation of value added dairy products. CO 5 Describe the clinical findings, treatment and control measures of livestock diseases.