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

CRITERION 1 - CURRICULAR ASPECTS

1.1.1 Curricula developed and implemented have relevance to the local, national, regional and global developmental needs which is reflected in Programme outcomes (POs), Programme specific outcomes (PSOs) and Course Outcomes (COs), of the Programmes offered by the Institution.

NAME OF THE PROGRAMME: B. SC., ZOOLOGY **PROGRAMME CODE: UAZO**

PROGRAMME OUTCOMES (PO)

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

PO 1	Acquire knowledge on the concepts of various branches of Zoology
PO 2	Understands the complex interactions in among various living organisms
PO 3	Acquire basic skills in the fundamentals of animal sciences and biological techniques through hands on training

PO 4	Apply the knowledge and skill to take up higher education, entrepreneurship and employment in government and private sectors.
PO 5	Develop the quest for research for the betterment of environment and mankind with ethical responsibilities

PROGRAMME SPECIFIC OUTCOMES (PSO)

On completion (after two years) of B.Sc. Zoology programme, the graduates would be able to

PSO 1	Gain comprehensive knowledge in different branches of Zoology – Invertebrata, Chordata, Cell biology, Physiology, Environmental Biology, Biochemistry, Microbiology, Immunology, Embryology, Entomology, Genetics, Molecular Biology, Biotechnology, Biostatistics, Bioinformatics and Evolution.
PSO2	Acquire technical skills in performing experiments in the field of Microbiology, Cell Biology, Biochemistry, Plant Physiology, Human Physiology, Molecular Biology, Environmental Biology,

	Developmental Biology, Biostatistics, Immunology, Evolution, Genetics, Clinical Laboratory Techniques, Biotechnology and Bioinformatics.
PSO 3	Develop empathy and instill love towards conserving plants and animals.
PSO 4	Express ideas and concept through seminar and assignments.
PSO 5	Solve the environmental problems by applying the biological principles for minimizing pollutants in air, water and land.
PSO 6	Develop environmental concern towards value of economically important plants, Biodiversity promote Bioremediation, Bio fertilizer and vegetative propagation.
PSO 7	Adopt Good Laboratory Practice, bioethics and biosafety guidelines to ensure minimal use of animals during experiments.
PSO 8	Exhibit the holistic growth by developing subject proficiency, interpersonal skills, and show vertical mobility in taking up PG courses and horizontal mobility by enrolling in B.Ed institution, clinical laboratory course and seek employment in schools, Medical coding and IT companies.

PSO 9	Make them self employed/ Entrepreneur in the field of Sericulture, Vermitechnology, Ornamental fish culture, Dairy farming, Apiculture, Mushroom cultivation and Horticulture.
PSO 10	Use of computers for Power point presentation, Virtual Dissection, analysis of bio- molecules using bioinformatics tools and computing biological data.
PSO 11	Healthy diet pattern for combat life style disorder.

COURSE CODE	COURSE TITLE	NATURE OF THE COURSE (LOCAL/ NATIONAL/REGIONAL/ GLOBAL)	COURSE DESCRIPTION	COURSE OUTCOMES
19Z1CC1	Invertebrata	All the Three	This is an introductory taxonomy course to the Zoology Program which	CO 1 Recall the levels of organization of animal kingdom and describe the origin of metazoan.

			organizes the distribution of animals according to common characteristic features charted out by Linnaeus, all animals are classified into seven categories: kingdom, phylum, class, order, family, genus and species along with the type study.	CO 2 Elaborate the general characteristics, Classes and general topics of Acoelomate unicellular and multicellular organisms CO 3 Determine the general characteristics, Classes and general topics of Coelomate Multicellular organism. CO 4 Analyse the general characteristics, Classes and general topics of Coelomate (Annelida and Arthropoda) Multicellular organisms. CO 5 Assess the general characteristics, classes and general topics of Coelomate (Mollusca and

				Echinodermata) multicellular organisms.
19Z1CC2	Cell Biology	Global &National	This course deals with the study of structure and functions of the cell.	CO 1 Identify the techniques involved in Cytology. CO 2 Outline the structural organization of plasma membrane and endoplasmic reticulum. CO 3 Determine the structural and functional significance of Ribosomes, Golgi Complex, Lysosomes, centrioles and Mitochondria. CO 4 Analyze the structural organization and functional significance of nucleus and nucleic acids.

				CO 5 Correlate the dynamics of cell division with cancer invasion.
19Z1CC3	Lab- Invertebrata & Cell Biology	All the Three	This Course aims to develop Identify the salient features of Invertebrates and Preparation and use of Microscopic Slides.	CO 1 Recognizes the levels of organization among Invertebrates. CO 2 Illustrate the Skill of Dissection of Organisms CO 3 Recalls the Structure and Functions of Cellular Organelles. CO 4 Summarize the unique features of different Phyla among Invertebrates. CO 5 Demonstrate skill of handling Microscopes.
19Z1NME	Maternity & Child Health	National	This course intends to create awareness on women health	CO 1 Recall the reproductive systems and women health problems.

			problems and solutions and common problems and antenatal care during pregnancy. It aims to educate on public health, personal hygiene, and nutrition for children and pregnant mother.	CO 2 Discuss the care taken during pregnancy and family planning methods. CO 3 Select the nutrition and immunization pattern for pregnant woman and children. CO 4 Describe the causes, symptoms, diagnosis and treatment of six killer diseases. CO 5 Analyze the causes, symptoms, diagnosis and treatment of urinary tract infection and sexually transmitted diseases.
19Z2CC4	Chordata	All the Three	This course imparts knowledge on the salient features,	CO 1 Recall the levels of organization among Chordates.

			classification and uniqueness of the Classes of Phylum Chordata.	CO 2 Bring out the general characters and classification of Chordates. CO 3 Distinguish between the Classes of Chordates. CO 4 Identify the Systematic Position of Animals. CO 5 Evaluate the unique features of each Class of Chordates.
19Z2CC5	Genetics	Global &National	This course concerned with the study of genes, genetic variation, and heredity in organisms	CO 1 Recall the Mendelian laws and highlight the different types of genetic interactions. CO 2 Illustrate the multiple gene inheritance and the mechanism of Linkage and Crossing over.

				CO 3 Determine the concept of sex determination and the patterns of inheritance. CO 4 Correlate the types of mutations with chromosomal abnormalities. CO 5 Infer the concepts in genetics to improve the livelihood.
19Z2CC6	Lab- Genetics & Chordata	All the Three	Focuses on understanding the uniqueness of Chordates and genetic inheritance of characters in Man	CO 1 Recognizes the levels of organization among Chordates. CO 2 Classify Chordates upto class level. CO 3 Distinguish the Mendelian Traits as Dominant and Recessive. CO 4 Develops the skill of dissecting organisms and displaying. CO 5 Interprets the Pedigrees.

19Z2NME	Maternity & Child Health	National	This course intends to create awareness on women health problems and solutions and common problems and antenatal care during pregnancy. It aims to educate on public health, personal hygiene, and nutrition for children and pregnant mother.	CO 1 Recall the reproductive systems and women health problems. CO 2 Discuss the care taken during pregnancy and family planning methods. CO 3 Select the nutrition and immunization pattern for pregnant woman and children. CO 4 Describe the causes, symptoms, diagnosis and treatment of six killer diseases. CO 5 Analyze the causes, symptoms, diagnosis and treatment of urinary tract infection and sexually transmitted diseases.

19Z3CC7	Human Physiology	Global &National	The course focuses on the complex organization of different organ systems and their functions.	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. CO 5 Analyze the structure and functions of Endocrine glands and sense organs and their disorder.

19Z3CC8	Environmental Biology	All the Three	Review of ecological concepts to the understanding of 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	All the Three	The course focuses on the interactions between organisms and the environment, and	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.

			the consequence of these interactions in natural populations, communities and the ecosystems through experimental approach.	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.
19Z3SB1	Vermitechnology	All the Three	This course imparts knowledge on the culture of earthworms and the preparation of vermicompost by recycling the waste through teaching	CO1 Identify the different species of earthworm and elucidate the biology of earthworms CO2 Classify the ecological group of earthworms and discuss the role of earthworm in diverse applications.

			and fieldtrip and eventually motivate the learners to become an entrepreneur.	CO3 Organize the methods of Vermicomposting and identify factors affecting vermicompost. CO4 Analyse the physical, chemical and biological properties and maintenance of vermicompost. CO5 Examine the economics and prospects of vermiculture as self – employment avenues.
19Z3ACQ1	Plant Diversity & Pathology	All the Three	To understand the structure & life cycle of Plant groups	CO 1 Recognize the structure, life cycle and economic importance of Algae & Fungi. CO 2 Identify the plant diseases & control methods and Lifecycle & uses of Lichens

				CO 3 Show general characters & life cycle of Bryophytes, Pteridophytes and Gymnosperms CO 4 Classify the Angiosperms & list their uses CO 5 Relate the plants to their economic uses
19Z3ACQ2	Lab- Plant Diversity & Pathology		To understand the structure and function of different plant groups	CO 1 Prepare suitable sections of Algal & fungal specimens CO 2 Compare the structure of Algae, Fungi, Bryophytes, Pteridophytes & Gymnosperms CO 3 Analyze the plant diseases and control methods

				CO 4 Identify flowering plants & their taxonomical position CO 5 Recall the economically useful plants
19C3ACZ1	Animal Diversity, Physiology & Genetics	National	This course is designed for the chemistry student which discusses the branch of Zoology that deals with animal diversity, structure and function of various systems, development and inheritance of man.	CO 1 Outline the general characters with of invertebrate and chordata with reference to organization, symmetry, body cavity CO 2 Explain the digestive system, role of enzymes, digestion and absorption of Carbohydrates, Protein and Fat in Man. CO 3 Distinguish between internal and external respiration in context to the mode and transport of gas exchange.

				CO 4 Summarize the structure and function of heart, Kidney, eye and ear. CO 5 Explain the Mendelian Laws Of Inheritance & Allelism
19C3ACZ2	Lab- Animal Diversity, Physiology & Genetics		Students develop laboratory skills with identification of preserved specimen, manipulation of prepared slides, dissections and display under the microscope	CO 1 Outline the Laboratory biosafety guidelines and good laboratory practices. CO 2 Dissect and mount the Body setae of Earthworm CO 3 List out the features of the given spotters *Amoeba, Taenia solium*, *Nereis*, *Amphioxus* (entire), *Anguilla* (Eel), Toad (*Bufo*), Cobra, Chamaeleon, Pigeon and various Syndromes.

				CO 4 Choose the appropriate qualitative test for the analysis of carbohydrates, proteins, lipids, urea and uric acid in the given sample CO 5 Illustrate the structure of human ear, eye and heart.
19Z4CC10	Microbiology	Global &National	This course deals with the study of microorganisms and its interaction with the environment.	CO 1 Examine the culturing methods and phenotypic identification of microbes CO 2 Examine the taxonomical classification, reproduction and genetic recombination in bacteria. CO 3 Elaborate the morphologic properties and cultivation of viruses. CO 4 Determine the role of microbes in the environment.

				CO 5 Correlate the technology of fermentation with the microbial production industrial products
19Z4CC11	Evolution	Global	"Nothing in Biology makes sense except in the light of Evolution" – Dobzhansky. The Course will provide a comprehensive knowledge on the history of evolutionary theories, evidences for evolution, origin of life, natural	CO 1 Recognize the basic concepts of origin of life and evidences of evolution. CO 2 Paraphrase the theories of evolution CO 3 Examine the Modern synthetic theory and the factors causing variation. CO 4 Organize the types and salient features of natural selection and mimicry. CO 5 Interpret the concept of speciation and human evolution

			selection, speciation and human evolution	
19Z4CC12	Lab-Microbiology & Evolution	All the three	To gain skills in analyzing the clinical and environmental samples and to learn basic techniques in microbiology and 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	All the three	Develop basic knowledge in mushroom cultivation and spawn production	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	All the Three	To study basic functioning of plant life.	CO1 Recall structure & functions of various plant tissues CO2 Paraphrase the mechanism of transpiration, photosynthesis, respiration & plant growth regulators CO3 Identify the structure & development Embryology of plan CO4 Examine techniques in the crop improvement programmes CO 5 Plan a home garden using horticultural techniques
19Z4ACQ4	Lab-Developmental Botany & Plant Breeding	All the Three	To study basic functioning of plant life.	CO1 Illustrate the anatomy of plants CO2 Prepare experimental set ups in plant physiology

				CO3 Recall the structure & functions of stomata CO4 Apply emasculation & horticultural technique in plant improvements CO 5 Compare the stages of dicot embryo
19C4ACZ3	Cell & Molecular Biology	National	This course is designed for the chemistry student which discusses the branch of Zoology that deals with Cell and 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	All the Three	Students develop laboratory skills with identification of preserved specimen, manipulation of prepared slides, dissections and display under the microscope	CO 1 Identify the squamous epithelial cells Under microscope CO 2 Dissect and mount the Polytene Chromosomes in the Salivary gland of *Chironomus* larva. CO 3 Interpret the mitotic stages from the squash preparation in Onion root tip CO 4 Recognize the features of the given spotters: Stages of Meiosis, Cellular organelles – Mitochondria, Endoplasmic reticulum, Golgi complex, Nucleus

				CO 5 Recall the structure and replication of DNA
Z5CC11	Biochemistry	Global &National	To familiarize the students with the structure and role of biomolecules and the physiochemical processes of the living beings	CO 1 Describe the properties and biological significance of Biomolecules CO 2 Classify amino acids based on the nature of their functional group. CO 3 Discuss the metabolic pathways of carbohydrates, proteins and lipids. CO4 Describe the factors affecting the normal functions of the enzymes
Z5CC12	Molecular Biology	Global &National	To understand the molecular processes of cells and the flow of	CO 1 Illustrate the Watson and Crick model of DNA double helix CO 2 Describe the mechanism of DNA replication and the role of enzymes

			genetic information and to appreciate the regulatory mechanisms of gene expression by the complex interactions of biomolecules.	CO 3 Describe the transcription and translation in prokaryotes and eukaryotes
Z5CC13	Biophysics & Instrumentation	Global &National	To study the basic principles of Biophysics that is relevant and applied to the life principle and the usage of instruments in biological studies	CO 1- Describe the principles of physics involved in the structure of biomolecules, energy transformation in living systems CO 2- Relate the use of modern physical instruments for the exploration of knowledge in Biology.

Z5ME1	Embryology	Global &National	To acquaint the students with development of cell from egg to the foetus stage.	CO 1 Recall the basic concepts of developmental biology. CO 2 Tell how fertilization, cleavage and gastrulating occur. CO 3 Relate the development of egg into a foetus, then into adult, among Vertebrates.
Z5ME2	Entomology	All the Three	To learn about the classification, biology and control of insects and to appreciate the importance of insects	CO 1 Compare the morphological features of different orders. CO 2 Summarize the beneficial aspects of insects. CO 3 Identify the agricultural pests and the economic damage caused.

Z5SB3	Ornamental Fish Culture	All the Three	To enable the students to be familiarized with ornamental fishes and to motivate them to become entrepreneur	CO1 List the types of aquarium. CO2 Plan the use of common aquarium ornamental fish and aquatic plants to decorate it. CO3 Explain the techniques followed in ornamental fish breeding. CO4 Compare the symptoms of various diseases prevalent in ornamental fish.
Z5SB4	Sericulture	All the Three	To motivate young minds to become an entrepreneur for practicing sericulture as cottage industry.	CO 1 List the importance of sericulture as cottage industry and the support provided by Central Silk Board. CO 2 Explain the different methods of vegetative propagation followed in mulberry cultivation.

				CO 3 Outline the life cycle of mulberry silkworm and the methods of rearing. CO 4 Find various diseases that affect silkworm and cocoon formation
Z6CC14	Immunology	Global &National	To understand the immune system and immune response involved in human body. To help students develop the skills necessary for the critical analysis of contemporary on	CO 1 Outline the types of immunity, immunization and origin of immune cells CO 2 Explain the structure and properties of antigen and antibody CO 3 Identify the immunological technique CO 4 Describe the types and mechanism of immune response

			topics related to health and disease.	
Z6CC15	Biotechnology	Global &National	To familiarize the use of the techniques of engineering and technology in Biology for the study of living organisms, to modify products or processes for specific use. Also, to find solution of problems concerning human activities including	CO 1 Identify the principles and applications of Biotechnology for the benefit of mankind CO 2 Outline the development of transgenic plants, animals, and microbes or products for specific use CO 3 Discuss the solutions to problems concerning human activities in the field of Agriculture, Medicine. Industry and Environment

			agriculture, medical treatment, industry and environment	
Z6ME3	Biostatistics	Global &National	To study the statistical significance data and analysis of the Biological aspects in life	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.
Z6ME4	Clinical Laboratory Technique	All the Three	Job oriented course on the methods of testing the clinical samples	CO 1 Identify the different sterilization methods followed in clinical laboratory. CO 2 Explain the collection method and techniques used in laboratory for urine analysis.

				CO 3 Find the way to process clinical specimens safely according to established procedures.
Z6ME5	Bioinformatics	Global &National	To enable the students to appreciate the significance of computational programs in the development and analysis of biological database	CO 1 Enumerate the applications of bioinformatics CO 2 List web browsers and search engines CO 3 Classify biological databases
Z6ME6	Human Genetics	Global &National	To study the modes of inheritance of congenital disorders and their	Co 1Classify the types of genetic disorders Co 2 Explain the mode of inheritance of congenital disorders

			preventive measures	
Z6SB5	Apiculture	All the Three	To enable the students to be familiarized with Bee keeping techniques and to motivate them to become entrepreneur	CO 1 Explain the scope of apiculture in India CO 2 List the equipment's used in bee keeping CO 3 Outline the types of bee diseases
Z6SB6	Dairy Farming	All the Three	To enable the students to be familiarized with management of high yielding cow species,	CO 1 Recall the scope of Dairy Farming and Dairy Technology. CO 2 Identify the features of various indigenous and exotic breeds of dairy cattle's.

			preparation of value added products using milk and to motivate them to become an entrepreneur	CO 3 Develop an idea regarding the formulation of value added dairy products. CO4 Describe the clinical findings, treatment and control measures of livestock diseases.
Z6CC16	Major Practical III	All the Three	Students gain hands-on experience and learn the theoretical basis of lab techniques common to a variety of biological disciplines	CO 1 Develop skills in handling basic equipment's CO 2Relate the chemical properties biomolecules with the qualitative analytical tests of Biomolecules CO 3 Demonstrate the genomic DNA isolation, DNA estimation and chromatography CO 4 Identify the spotters