PROGRAMME OUTCOMES AND COURSE OUTCOMES

2021 – 2022

NAME OF THE PROGRAMME: B.Sc Zoology **PROGRAMME CODE: UAZO**

Programme outcomes (POs)

PO 1	Apply acquired scientific knowledge to solve complex issues.
PO2	Attain Analytical skills to solve complex cultural, societal and environmental issues.
PO3	Employ latest and updated tools and technologies to analyse complex issue.
PO4	Demonstrated Professional Ethics that foster Community, Nation and Environment Building Initiatives.
PO5	Apply the knowledge and skill to take up higher education, entrepreneurship and employment in government and private sectors.

Course Outcomes (COs)

Course Code	COURSE TITLE	Course Outcomes
19Z1CC1	Invertebrata	CO 1 Recall the levels of organization ofanimal kingdom and describe theorigin of metazoan. CO 2 Elaborate the general characteristics, Classes and general topics of Acoelomate unicellular and multicellularorganisms CO 3 Determine the general characteristics, Classes and general topics of Coelomate Multicellular organism. CO 4 Analyse the generalcharacteristics, 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	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	CO 1 Recognizes the levels of organization among Invertebrates. CO 2 Illustrate the Skill of Dissection of Organisms CO 3 Recalls the Structureand Functions of Cellular Organelles. CO 4 Summarize the unique features of different Phyla among Invertebrates. CO 5 Demonstrate skill of handling Microscopes.

19Z1NME	Maternity and Child Health	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 sexuallytransmitteddiseases.
19Z2CC4	Chordata	CO 1 Recall the levels of organization among Chordates. 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	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- Chordata & Genetics	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 and Child Health	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	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	CO 1 Paraphrase the structure and function of the Ecosystems CO 2 Identify the characteristics of a population and their interactions. CO3Categorize 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 foodweb in different ecosystem and identification of spotters.
19Z3SB1	Vermitechnology	CO1 Identify the different species of earthworm and elucidate the biology of earthwormsCO2Classify the ecological group of earthworms and discuss the role of eart hworm in diverse applications. 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	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 CO4Classifythe Angiosperms & list their uses CO 5 Relate the plants to their economic uses
19Z3ACQ2	Lab- Plant Diversity & Pathology	CO1 Construct suitable micro preparations CO2 Construct sections of given plant materials with illustration and description

		CO3 Make use of dissection microscope to display the floral parts of Angiosperms CO4 Identify specimens and slides from Algae, Fungi,Lichens,Bryophytes, Pteridophytes and Gymnosperms included in the syllabus CO5 Identify the economically useful plants
19C3ACZ1	Animal Diversity, Physiology & Genetics	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 ofheart, Kidney, eye and ear. CO 5 Explain the Mendelian Laws Of Inheritance & Allelism

19C3ACZ2	Lab- Animal Diversity, Physiology & Genetics	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	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	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 5Interpret the concept of speciation and human evolution
19Z4CC12	Lab-Microbiology & Evolution	CO 1Find the working Principle andApplications 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 1State 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 anddiseases affecting mushrooms. CO 5 Prepare a business plan for small scale enterprise
19Z4ACQ3	Developmental Botany & Plant Breeding	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 plant 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 cellsUnder 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
19Z5CC13	Fundamentals of Biochemistry	CO 1 Describe the structural, properties, biological significance of carbohydrates, proteins and lipids. CO 2 Classify lipids based on their complexity CO 3 Classify amino acids and proteins based on their structure CO 4 Construct the flow chart to highlight the metabolic pathways of carbohydrates, proteins and lipids.

		CO5 List down the factors affecting the normal functions of the enzymes and biological functions of the vitamins.
19Z5CC14	Molecular Biology	CO 1 Illustrate the Watson and Crick model of DNA double helix; mechanism of DNA replication and the role of enzymes CO 2 Discuss the different types of DNA damages and repair mechanisms CO 3 Describe the transcription and translation in prokaryotes and eukaryotes 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 Rf 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. CO 3 Apply the basic numeric and graphical techniques to display and summarize the collected data. CO 4 Interpret statistical results effectively in context toCorrelation and Regression.

		CO 5 Choose and apply appropriate statisticalmethods for analyzing one or two variables.
19Z5ME2	Animal Behaviour	CO 1 Outline the scope and history of Ethology CO 2 Explain the types of learning CO 3 Summarize the methods adopted by the animals in mate selection. CO 4 Discuss the various parameters controlling the behaviour in context to nerve and hormone CO 5 Recall the types and features of biological rhythm
19Z5SB3	Ornamental Fish Culture	CO 1 List the types of aquarium. CO 2 Plan the use of common aquarium ornamental fish and aquatic plants to decorate it. CO 3 Outline the physico – chemical parameters of water required for the growth of fish. CO 4 Explain the techniques followed in ornamental fish breeding.

		CO 5 Identify the symptoms of various diseases prevalent in ornamental fish.
19Z5SB4	Sericulture	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 Organize the steps involved in processing of silk and its marketing. CO 5 Find various diseases that affect silkworm and cocoon formation
19Z6CC17	Basic Immunology	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 antigen and antibody interactions and the steps involved in the immunological techniques CO 4 Illustrate the types and mechanism of immune response and events in hybridoma technology CO 5 Describe the types of hypersensitivity reactions and autoimmune diseases
19Z6CC18	Principles of Biotechnology	CO 1 Identify the principles and applications of Biotechnology biosafety guidelines and IPR for the benefit of mankind 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 CO 3 Describe basic techniques in animal cell culture and the application of stem cell production. CO 4 Summarize the biotechnology products and applications in the healthcare products, medicine, agriculture CO 5 Analyse the appropriate technology and application of

		biotechnology in industry and environmental sectors to increase SCP production and sewage management.
19Z6CC19	Lab- Immunology	CO 1 Relate the knowledge of basic principles of immunology to carry out the related experiments CO 2 Acquire skills in handling basic equipments CO 3 Infer the outcome of the experiments of Immunology CO 4 Relate the biochemical properties of Glucose, Albumin & Ketone bodies while performing the qualitative analytical tests for their detection in urine sample CO 5 Develop familiarity with the principles of Laboratory safety
19Z6CC20	Lab- Biotechnology	CO 1 Acquire skills in handling basic equipments CO 2 Identify the insects CO 3 Estimate the various biomolecules using standard protocols CO 4 Identify and comment on the spotters Agarose gel electrophoresis, SDS-PAGE, pBR322, Spirulina and Insulin

		and Bioinformatics tools CO 5 Examine the features in mouth parts of Cockroach & Honey bee, Pests of Agricultural Importance – Rice Weevil, Rhinoceros Beetle
19Z6ME3	Embryology	CO 1 Recall the basic concepts of developmental biology. CO 2 Tell how fertilization, cleavage and gastrulating occur. CO 3 Compare the basic concepts of organogenesis in different organisms. CO 4 Relate the development of egg into a oetus, then into adult, among Vertebrates. CO 5 Associate the embryo development with Phylogeny.
19Z6ME4	Clinical Laboratory Technique	CO 1 List the different sterilization methods followed in clinical laboratory. CO 2 Explain the collection method and techniques used in laboratory for urine analysis.

		CO 3 Outline the method of blood collection and related analysis. CO 4 Find the way to process clinical specimens safely according to established procedures. CO 5 Utilize the knowledge of karyotyping in detection of congenital malformations.
19Z6ME5	Bioinformatics	CO 1 Enumerate the applications of bioinformatics, web browsers and search engines and biological databases CO 2 Describe the flat file of UniProtKB, secondary and tertiary structure prediction CO 3 Employ the appropriate substitution matrices and global and local alignment and BLAST CO 4 Summarize the methods of multiple sequence alignment and phylogenetic tree CO5 Compute and develop Ramachandran plot and protein structure prediction
19Z6ME6	Entomology	CO 1 List the different ethods of insect collection. CO 2 Find the Morphological modifications of insects with

		different functions. CO 3 Summarize the beneficial aspects of insects.Lect CO 4 Explain the harmful effects of insects. CO 5 Identify the agricultural pests and the economic damage caused.
19Z6SB5	Apiculture	CO 1 Explain the scope of apiculture in India CO 2 Recall the structure of honey bee 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.