AQAR – QUALITATIVE METRIC

2022 - 2023

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: M.Sc ZOOLOGY

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.

Programme Specific Outcomes:

PSO 1	Gain comprehensive knowledge in different branches of zoology – Cell & Molecular Biology, Biochemistry, Microbiology, Developmental Biology, Immunology, Genetics, Biotechnology, Bioinformatics and Evolution.
PSO2	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.
PSO 10	Make them self employed/ Entrepreneur in the field of Sericulture, Fisheries and Aquaculture, Dairy farming, Apiculture and Poultry.
PSO 11	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 Outcomes

Course Code	Course Title	Nature of the Course (Local/ National/Regional/Global)	Course Description	Course Outcomes
19PG1Z1	**Animal Diversity**	All the Three	This course provides an overview of the Invertebrate and Vertebrate animals by focussing on the General characters, Classification, Special features and Biology of some selected	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 Vertebrates.	Invertebrates and Chordates. CO 5 Predict the systematic Position of Animals.
19PG1Z2	**Microbiology**	Global& National	To understand the fundamentals of microbial diversity and applications of microbes in Industry and Environment.	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, 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**	Global& National	This course deals with the central dogma of molecular biology and to understand the basis of heredity.	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**	All the Three	This course deals with the learning skills of microbial techniques and fundamentals of diversity of species.	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**	All the Three	It includes cell biology experiments such as observation of mitotic stages in onion root tip and visualizing giant chromosome in *Chironomus* larva and isolation and estimation of DNA and RNA.	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
19PG1ZEDC	**Herbal Medicine**	National & Regional	This course deals with the study of medicinal plants and therapeutic values of herbs.	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**	Global& National	This course provides the knowledge of Mendelian inheritance and understanding the molecular basis of mutation which leads to genetic defects in human.	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**	Global	To understand the origin of life on the earth through	CO1 Outline the origin and evolution of life

			the process of evolution.	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**	Global& National	The course is designed to provide firm foundation in the principles of Biochemistry by providing knowledge on structure,biochemical properties of biomolecules and the role of these biomolecules in the major	CO 1Analyse the metabolic pathways of carbohydrates CO 2Recall the structure, properties and metabolism of amino acids and Protein. CO 3Assess the structure, properties and metabolism of Lipids CO 4Identify the structural

			metabolic pathways of a living system.	organization and metabolism of Nucleic Acids. CO 5 Describe the mechanism of enzyme and hormone action.
19PG2Z9	**Lab in Genetics & Evolution**	All the Three	This course deals with the laboratory experiments that teach the concepts of inheritance of genes and to explore evolutionary dynamics.	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**	All the	Students gain hands-on	CO 1 Find appropriate skills in

	Biochemistry	Three	experience and learn the theoretical basis of lab techniques common to a variety of biological disciplines such as Biochemistry and they will work in groups, learning how to collect, analyze, and present data while using the scientific method to conduct inquiry-based laboratory experiments.	handling basic equipments 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

19PG2ZEDC	**Herbal Medicine**	National &Regional	This course deals with the study of medicinal plants and therapeutic values of herbs.	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**	Global& National	It provides hands on experience on the tools and techniques of SPSS statistical package.	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**	Global& National	Biophysics which is an inter disciplinary course, deals with the discipline concerned with the application of the principles and methods of physics and the other physical sciences to the solution of biological problems.	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**	Global& National	The course intends to provide the biology of immune system and mechanism of immune response, maturation of lymphocytes and major histocompatibility complex and immune system	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

			related disorders and vaccines.	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**	Global& National	This course deals with specific procedures or techniques used to identify and process the research data.	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 Parapharse the research work through documentation as a Thesis, Oral or Poster Presentation.
19PG3ZE1	**Fisheries &Aquaculture**	All the Three	This Course focuses on Fisheries and Aquaculture of Finfishes, Marine Prawn, Pearl Oyster and Disease Management.	CO 1 Identify the economically important fishes and fisheryproducts. CO 2 Plans according to the recent concepts in fisheriesmanagement. CO 3 Distinguish the various aquaculture systems. CO 4 Organizes the type of hatchery, brood stock, larvalproduction, feed management water quality and diseasemanagement in cultivable species, live feed production.

				CO 5 Evaluates the Fisheries and Aquaculture Practices in India.
19PG3ZE2	**Bioinformatics**	Global& National	The course provides an outline on various DNA sequencing methods, and principle and methods of sequence analysis with various bioinformatics tools and macromolecular structure prediction.	CO 1 Summarize the Human Genome Project, shotgun sequencing, web browsers and search engines and flatfile 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**	All the Three	The course is designed to give a hand on experience in Biophysics and 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

19PG3 Z15	**Lab in Immunology, Fisheries & Aquaculturea nd Bioinformatic s**	All the Three		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, Immunoelectrophoresis and rocket immunoelectrophoresis identification and single / double immunodiffusion CO 5 Analyze the sequences BLAST AND ClustalO and Assess the

				formation of perciptin line and button formation
19PG4Z16	**Environmental Biology**	All the Three	To understand the basic concepts of Ecology.	CO 1Develop an understanding of ecological key interactions and processes CO 2 Explain the factors involved in determining population size, Density, Distribution &Community function CO 3 Analyze 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**	Global& National	This course provides knowledge about genetic engineering and rDNA technology and its application in gene therapy, cell culture and GM food.	CO 1Find the enzymes in rDNA technology CO 2Compare the cloning vehicles with their specific advantages CO 3Criticize 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**	Global& National	This Course focuses on the developmental process from a single egg to zygote by fertilization, into blastula by Cleavage, followed by Gastrulation into Gastrula. From	CO 1 Recalls the basic concepts of Developmental Biology. CO 2 Explain how fertilization, cleavage and Gastrulation occur. CO 3Compares the basic concepts of organogenesis in differentorganisms.

			Gastrula, organ forming rudiments are formed, which give rise to the Organ Systems of the Organism.	CO 4Understand the development of egg into a foetus, then intoadult. CO 5 Associate the embryo development with Phylogeny.
19PG4ZE3	**Economic Zoology**	All the Three	The course has great potential for creating self-employment and business opportunity	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**	All the Three	Students gain knowledge on learning, behaviour and biorhythm in animal.	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 Environment**	All the	This course provides knowledge about the	CO 1 Find the primary productivity

	al Biology & Developmental Biology	Three	relationship between organisms and their environment. It also helps to learn about development of organisms.	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**	All the Three	This course provides rich knowledge in isolating DNA from different sources. It also helps to observe the behavioural pattern of selected animals.	CO 1Demonstrate 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