Sree Narayana Mangalam College Maliankara

(Affiliated to Mahatma Gandhi University, Kottayam)

PROGRAMME OUTCOME

PROGRAMME SPECIFIC OUTCOME, COURSE OUTCOME

M.Sc ZOOLOGY

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At the end of the Post Graduate Program at S.N.M College, Maliankara, a student will have developed:

POST GRADUATE PROGRAMME OUTCOMES

PO1:	**Subject competence and Problem Solving:** Understanding the respective subject matter to become subject experts in the field and solve problems of relevance to society to meet the specified needs using the knowledge, skills and attitudes acquired from the program of study is the sole intention of this program outcome. It enables the student at viewing multiple perspectives to analyse any situation/task at hand and derive feasible solutions by optimistically approaching a problem. This inculcates independent research aptitudes and strong decision
PO2:	**Research-related skills:** A sense of inquiry and capability for asking relevant/appropriate questions, problem solving, synthesizing and articulating; Ability to recognise cause-and-effect relationships, define problems, formulate hypotheses, test hypotheses, analyse, interpret and draw conclusions from data, establish hypotheses, predict cause-and-effect relationships; ability to plan, execute and report the results of an experiment or investigation.
PO3:	**Cooperation/Team work:** Ability to work effectively and respectfully with diverse teams; facilitate cooperative or coordinated effort on the part of a group, and act together as a group or a team in the interests of a common cause and work efficiently as a member of a team.
PO4:	**Analytical reasoning:** Ability to evaluate the reliability and relevance of evidence; identify logical flaws and holes in the arguments of others; analyze and synthesize data from a variety of sources; draw valid conclusions and support them with evidence and examples, and addressing opposing viewpoints.
PO5:	**Scientific Reasoning:** Ability to analyze, interpret and draw conclusions from quantitative/qualitative data; and critically evaluate ideas, evidence and experiences from an open-minded and reasoned perspective.

PO6:	**Self-directed Learning**: Ability to work independently, identify appropriate resources required for a project, and manage a project through to completion.
PO7:	**Critical Thinking:** Capability to apply analytic thought to a body of knowledge; analyze and evaluate evidence, arguments, claims, beliefs on the basis of empirical evidence; identify relevant assumptions or implications; formulate coherent arguments; critically evaluate practices, policies and theories by following scientific approach to knowledge development.

PROGRAMME SPECIFIC OUTCOMES

At the end of M.Sc Zoology at S.N.M College, Maliankara, a student will have developed:

PSO1	To distinguish between the Structure, Function, Behaviour and Evolution of different animals
PSO2	To analyse the mechanisms involved in life processes up to the molecular level.
PSO3:	To perform the analytical experiments in various fields of biological science.
PSO4:	To identify a research problem and to formulate a scientific solution.
PSO5:	To Perform, Assess and implement practical techniques and procedure to solve biological problems and analyse and quantify data collected during project
PSO6:	Development of theoretical and practical knowledge in handling the animals and using them as model organism
PSO7:	To Apply the wide range of subject based skills to various fields that provide a base for future career in disciplines such as Health Sciences, Agriculture, Environmental Management, Biotechnology , Publishing ,Teaching and Research

COURSE OUTCOMES

ZY1CT01- BIOSYSTEMATICS AND ANIML DIVERSITY

At the end of this course, a student will have developed ability to:

CO1:	To understand the phylogenetic relationships among the different groups of animals.
CO2:	To provide the latest trend in animal taxonomy and phylogenetic systematics
CO3:	To give a thorough understanding in the principles and practice of systematics.
CO4:	To helps students acquire and in-depth knowledge on the diversity and relationships in animal world.
CO5:	To develop an holistic appreciation on the phylogeny and adaptations in animals.
CO6:	To develop the knowledge about modern trends in taxonomy.

ZL010102 EVOLUTIONARY BIOLOGY AND ETHOLOGY

At the end of this course, a student will have developed ability to:

CO1:	To describe the concept of relatedness and its connection to biological evolution
CO2:	To apply knowledge to new information and data, as well as the capacity to effectively communicate the principles of evolution and its application to human biology.
CO3:	To expose students to the basics and advances in ethology, and generate an interest in the subject in order to understand the complexities of studying animal behavior on every level of the biological hierarchy.
CO4:	To provide an understanding on the process and theories in Evolutionary Biology
CO5:	To expose students to the bascis and advances in Ethilogy, and create an interest.
CO6:	To understand the complexities of both animal and human behaviour

ZL010103 BIOCHEMISTRY

At the end of this course, a student will have developed ability to:

CO1:	To understand the chemical nature of life and life process
CO2:	To provide an idea on structure and functioning of biologically important molecules.
CO3:	To generate an interest in the subject and help students explore the new developments in Biochemistry.
CO4:	To understand the importance of metabolism of bio macromolecules in normal physiology of a man.
CO5:	To understand the abnormal metabolism of biomolecules and the resultant diseases.
CO6:	To understand the chemical nature of life and life process.

LO10104 BIOSTATISTICS AND RESEARCH METHODOLOGY

At the end of this course, a student will have developed ability to:

CO1:	To impart concepts of statistics and research methodology, and create awareness about the gadgets, tools and accessories of biological research.
CO2:	To help students improve analytical and critical thinking skills through problem solving.
CO3:	To enable learners to effectively apply suitable statistical tests in research.
CO4:	To sensitize students about the ethics involved in research and enable them to come up with innovative research designs.
CO5:	To equip learners to prepare research papers and project proposals.
CO6:	To provide hands on training in the use of various tools and techniques.

ZL010105: PRACTICAL 1 ANIMAL DIVERSITY: EVOLUTIONARY, ETHOLOGICAL AND BIOCHEMICAL METHODS & APPROACHES

CO1:	To study different species of vertebrates and Invertebrates and their phylogenetic, morphological, ecological and pathological significance.
CO2:	understand the behaviour and activity pattern of different organisms based on field observation
CO3:	Enable the students to prepare keys and cladograms
CO4:	To develop the skills in student to do different statistical analysis using various softwares and onlinetools.
CO5:	Enable the students to understand and making the model of biomolecules using ball and stick models and software tools.
CO6:	To develop the skills in students to prepare whole mounts for further studies.

SEMESTER 2

ZL010201 FIELD ECOLOGY

CO1:	To provide the knowledge of animal adaptations to a variety of environment
CO2:	To learn the different aspects of population and its interactions
CO3:	To understand the natural resources and manmade issues on environment and its management
CO4:	To study various disciplines in Ecology
CO5:	To gain critical understanding on human influence on environment
CO6:	To study the basic theories and principles of ecology

ZL010202 DEVELOPMENTAL BIOLOGY

CO1:	To introduce the concepts and process in developmental biology
CO2:	To help students understand and appreciate the genetic mechanisms and the unfolding of the same during development

CO3:	To expose the learner to the new developments in embryology and its relevance to Man
CO4:	To attain a basic conceptual knowledge about the principle cellular mechanisms of development.
CO5:	To understand the medical implications of developmental biology
CO6:	To study the development of model organisms

ZL010203 GENETICS AND BIOINFORMATICS

CO1:	To learn and understand the principles and mechanism of inheritance
CO2:	To study the fine structure of genetic material and molecular basis of hereditary transmission
CO3:	To understand the significance of Genetics in Principle in heritance of traits in Man
CO4:	To understand the role of genetics in evolution
CO5:	To explore the emerging field of bioinformatics and to equip the students to takeup bioinformatics studies
CO6:	To study the development of proteomics and drug designing

ZL010204 MICROBIOLOGY AND BIOTECHNOLOGY

CO1:	To provide an over view of the microbial world, its structure and function
CO2:	To understand the fundamental aspects of the basic biology of bacteria and viruses
CO3:	To give students an intensive and in-depth learning in the field of biotechnology
CO4:	To familiarize the student with emerging field of biotechnology
CO5:	To understand the modern biotechnology practices and approaches with an emphasis in technology application, medical, industrial, environmental and agricultural areas and nanomedicine

CO6:	To familiarize the students with public policy, biosafety, and intellectual property rights issues related to biotechnology

PRACTICAL 2- DIVERSITY OF LIFE: ECOLOGICAL, EMBRYOLOGICAL, HEREDITARY AND MICROBIAL METHODS & APPROACHES

CO1:	To perform to know the various embryonic stages of animals
CO2:	To familiarise with various software related to Bioinformatics.
CO3:	To develop the skill to perform micrometric, microscopic and chromatographic techniques
CO4:	Learnt about the microbial culture methods.
CO5:	Analysed various physicochemical parameters in environmental matrices.
CO6:	To understand and perform microbiological techniques.

THIRD SEMESTER

ZI010301 Animal Physiology

CO1:	To study and compare the functioningof organ systems across the animal world
CO2:	To give an overview of thecomparativefunctioning of different systems in animals
CO3:	To learn more about human physiology
CO4:	To familiarize the student with human physiology
CO5:	To understand the modern approaches in Developmental Biology
CO6:	To give an over view importance of animal body and its protection

ZL010202 CELL AND MOLECULAR BIOLOGY

CO1:	To help study the structural and functional details of the basic unit of life at the molecular level
CO2:	To motivate the learner to refresh and delve into the basics of cell biology
CO3:	To introduce the new developments in molecular biology and its implications in human welfare
CO4:	To familiarize the student with *Fundamentals of gene regulation*
CO5:	To understand the modern approaches in Cell Biology
CO6:	To give an over view in new strategies for combating cancer

L010303 BIOPHYSICS, INSTRUMENTATION AND BIOLOGICAL TECHNIQUES

CO1:	To understand the biological system and processes based on physical principles
CO2:	To provide and insight on the tools and techniques of various instruments available for biochemical and biophysical studies
CO3:	To train the learner the operational skills of different instruments required in Zoology
CO4:	To understand the biological system and processes based on physical principles
CO5:	To understand the modern approaches in Biophysics
CO6:	To give an over view in histological techniques

ZL010304 IMMUNOLOGY

CO1:	To provide an intensive and in-depth knowledge to the students in immunology
CO2:	To help the learner to understand the role of immunology in human health and well-being

CO3:	To familiarize the students the new developments in immunology
CO4:	To understand the Immunogenicity and Antigenicity
CO5:	To understand new trendes in transplantation immunology
CO6:	To give an dea about Antigen –Antibody Interactions

ZY3CP03: PRACTICAL 3- MOLECULAR, PHYSIOLOGICAL AND MMUNOLOGICAL METHODS & APPROACHES IN BIOSCIENCES

CO1:	To describe the fine structure and functions of cell organelles.
CO2:	To perform a variety of molecular and cellular biology techniques.
CO3:	To understand biological chemistry and its importance in physiology by testing
CO4:	To familiarise with various software related to physiology.
CO5:	To perform Basic molecular biological techniques to manipulate DNA, RNA and Proteins.
CO6:	To develop skills in the field of histology.

FOURTH SEMESTER

ZL810401 ENVIRONMENTAL SCIENCE: CONCEPTS AND APPROACHES

CO1:	To provide a broad and deep understanding on environment and influence of man on environment
CO2:	To equip the students to use various tools and techniques for the study of environment

CO3:	To enable the learner to understand, think and evolve strategies for management and conservation of environment for sustaining life on earth
CO4:	To understand about vBiodiversity and its Conservation
CO5:	To take up further studies and research in the field
CO6:	To give an idea about weather, climate and microclimate and climate change

ZL810402 ENVIRONMENTAL POLLUTION AND TOXICOLOGY

CO1:	To provide a broad and deep understanding on environmental pollution
CO2:	To equip the students to use various tools and techniques for the control of environmental pollution
CO3:	To enable the learner to understand, think and evolve strategies for protection of environment
CO4:	To understand about impact of pollution
CO5:	To take up further studies and research in the field
CO6:	To give an idea about toxicology

ZL810403 ENVIRONMENTAL MANAGEMENTAND DEVELOPMENT

CO1:	To provide a broad and deep understanding on environmental management studies
CO2:	To equip the students to use various methods in environmental management studies
CO3:	To enable the learner to understand, think and evolve strategies for protection of environment
CO4:	To understand about impact of pollution
CO5:	To take up further studies and research in the field
CO6:	To give an idea about Disaster management

L810404 Practical: ENVIRONMENTAL SCIENCE

CO1:	To analyse various physicochemical parameters in environmental matrices.
CO2:	To Perform experiments in toxicological study.
CO3:	To Perform environmental sample analysis.
CO4:	To examine the toxicity of various heavy metals
CO5:	To equip the students to use various tools and techniques for the study of environment
CO6:	To elucidate the histo-pathological changes in tissues