



M.E.S MAMPAD COLLEGE (AUTONOMOUS)

MAMPAD COLLEGE P.O, MALAPPURAM, KERALA, INDIA, 676542

Affiliated to University of Calicut

Accredited by NAAC with A grade

Syllabus Year	2019-20
Department	M Sc
Programme	Zoology

Programme outcome.

Sl.No	Programme Outcome
P01	Critical Thinking: Take informed actions after identifying the assumptions that frame our thinking and actions, checking out the degree to which these assumptions are accurate and valid, and looking at our ideas and decisions (intellectual, organizational, and personal) from different perspectives.
P02	Problem Solving: Understand and solve the problems of relevance to society to meet the specified needs using the knowledge, skills and attitudes acquired from humanities/ sciences/mathematics/social sciences.
P03	Effective Communication: Speak, read, write and listen clearly in person and through electronic media in English and in one Indian language, and make meaning of the world by connecting people, ideas, books, media and technology.
P04	Effective Citizenship: Demonstrate empathetic social concern and equity centered national development, and the ability to act with an informed awareness of issues and participate in civic life through volunteering.
P05.	Environment and Sustainability: Understand the issues of environmental contexts and sustainable development.
P06.	Self-directed and Life-long Learning: Acquire the ability to engage in independent and life-long learning in the broadest context of socio- technological changes.

Programme specific outcome

Sl.No	Programme Specific Outcome.
PSO1	Understand the biological diversity and grades of complexity of various animal forms through their systematic classification and process of organic evolution.
PSO2	Understand the roles of plants, animals and microbes in the sustainability of the environment and their interaction among themselves and deterioration of the environment due to anthropogenic activities.
PSO3	Understand the concepts and principles of biochemistry, immunology, physiology, ethology, endocrinology, developmental biology, cell biology, genetics, molecular biology and microbiology and develop technical skills in biotechnology, bioinformatics and biostatistics.
PSO4	Perform laboratory procedures as per standard protocols in the areas of animal diversity, systematics, cell biology, genetics, biochemistry, molecular biology, microbiology, physiology, immunology, developmental biology, environmental biology, ethology, evolution and science methodology.

Course Outcome (add sufficient Number of rows in each semester)

Semester	Course Code	Course Name	Course out come
I	ZOL1C01 -	BIOCHEMISTRY AND CYTOGENETICS	<p>CO1 Comprehend the importance of molecular structure and interactions present in different biomolecules that aid in functioning and organization of living system.</p> <p>CO2 Interpret the structure-function relationships of the proteins, carbohydrates, lipids, and nucleic acids.</p> <p>CO3 Recognize various biochemical changes that obey the basic</p>

			<p>thermodynamic principles</p> <p>C04 Familiar with the enzymes, their salient characteristics including distinctive conformation and remarkable catalytic properties.</p> <p>C05 Conceptualize metabolic pathways and their regulation, metabolism of – Carbohydrates, lipids, proteins and nucleic acids.</p> <p>C06 Acquire insight into membrane structure and function, structural organization and function of intracellular organelles and organization of chromosomes and genes</p> <p>C07 Gain knowledge about the Cellular communication, concepts of various cellular signal transduction pathways and apoptosis</p>
	ZOL1C02 -	BIOPHYSICS AND BIOSTATISTICS	<p>C01 Be familiar with the colloidal System, diffusion and osmosis, pH and bioacoustics</p> <p>C02 Understand basic techniques of radiation biology, biophysical methods and electrophysiological methods</p> <p>C03 to understand communicate basic principles and applications of SEM &TEM</p> <p>C04 Should be able to understand the separation techniques, influence of gravity, nanotechnology</p> <p>C05 Understand the Scope and role of statistics and understand the basics of data, statistical methods, probability distributions</p> <p>C06 Identify and differentiate the statistical inference, correlation and</p>

			<p>regression</p> <p>C07 Can understand the basics of ecological data analysis</p>
	ZOL1C03 -	ECOLOGY AND ETHOLOGY	<p>C01 Acquired broad-based knowledge of the fundamentals of Ecology, Behavior and Evolution and the relationships among these disciplines.</p> <p>C02 Students demonstrated an ability to understand and apply fundamental quantitative skills, including models and statistical analyses, so as to properly interpret published research and apply such skills in their own research.</p> <p>C03 Obtained knowledge in Animal behaviour and the evolution of fixed and plastic behaviours, Life history evolution, parental investment, parent-offspring conflict and the evolution of behavior, Cooperative behaviour of animals, with particular emphasis on group living</p> <p>C04 Basic behavioural data collection and experimental design, including welfare and ethical implications are conceived</p> <p>C05 Conceived the evolution of optimal strategies, using examples from behavioural ecology</p>
II	ZOL2C04 -	PHYSIOLOGY	<p>C01 Perform human salivary amylase activity by colorimetric method, Qualitative demonstration of digestive enzymes in cockroach, Peptic value calculation, GI tract movements and its regulation by</p>

			<p>hormones, Obesity and BMR.</p> <p>C02 Perform urea and ammonia estimation, Understand different types of excretory organs, Structure and anatomy of Mammalian kidney and bladder, Urine formation, Osmoregulation and Renal clearance.</p> <p>C03 Determine Respiratory quotient of aquatic animal; understand the anatomy of respiratory organs, Mechanism of Pulmonary and Alveolar Ventilation and its neuro-physiological control, Pulmonary volumes and capacities and Oxygen Dissociation Curve.</p> <p>C04 Describe the structure, organization and functional areas of Human brain and its Protection, Diseased states of Brain, Memory, PNS and ANS, Spinal cord and Mechanism of Reflex action.</p> <p>C05 Understand Special Senses- Vision-Structure of Eyeball and mechanism of Image formation; Taste- Primary sensation, Structure of Taste buds and physiology of Taste; Smell- Olfactory receptors and physiology of smell.</p> <p>C06 Understand Tactile responses- Mechanoreceptors, Pain receptors and Thermal receptors</p> <p>C07 Understand the structure and physiological anatomy of myogenic heart and its neural regulation, Cardiac cycle, Blood volumes, Coronary blood flow and heart diseases.</p> <p>C08 Describe Lymph channels, composition and function of Lymph, RBC</p>
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	ZOL2C05 -	MOLECULAR BIOLOGY	<p>C01 Developing academically sound future researchers and intellectuals in the area of molecular biology</p> <p>C02 Understand how protein or enzymes of our body are synthesizing through detailed study of gene expression mechanisms</p> <p>C03 Understand how human genome is organized through the study of special features, components and complexity of eukaryotic genome</p> <p>C04 Provide knowledge about organization of different gene families in different organelles and organ systems and its expression in man</p> <p>C05 Understand about transposons and its role in gene expression in both prokaryotes and eukaryotes</p> <p>C06 Help to learn about how genetic variation occur through recombination</p> <p>C07 Understand about E.coli bacterial genome and different methods of its genetic transfer</p> <p>C08 Got a thorough knowledge about cancer biology and its new therapies like immunotherapy and gene therapy.</p>
	ZOL2C06 -	SYSTEMATICS AND EVOLUTION	<p>C01 Imparted knowledge of Systematics and Taxonomy and understand about the species concept in different levels and classification</p>

			<p>CO2 Acquired Knowledge of how Taxonomic Collections and the Process of identification are made</p> <p>CO3 Understand the Zoological Nomenclature and taxonomic procedures</p> <p>CO4 Understand the Role of Newer trends in systematics</p> <p>CO5 Understand the patterns and processes of evolution above the species level</p> <p>CO6 Appreciate the differences between the three methods of phylogenetic analysis: evolutionary systematics, phenetics, cladistics.</p>
III	ZOL3C07 -	IMMUNOLOGY	<p>Explain Hematopoiesis and its regulation, Study of cells of immune system such as T and B lymphocytes and perform its separation.</p> <p>CO2 Understand Antigens and epitopes; Antibodies and production of Monoclonal antibodies, production and preparation of antiserum and new trends of antibody engineering; Demonstration of agglutination reaction, Immuno-electrophoresis and ELISA technique.</p> <p>CO3 Understand B-cell and T-cell response, Enumerate different cytokines and related diseases and activation and regulation of Complement system.</p> <p>CO4 Describe organization and distribution of MHC ant its role in antigen presentation; Grafts and graft rejection and its immunological perspective.</p>

			<p>C05 Understand allergens and hypersensitivity reactions, Immunization and Vaccination, different vaccines and its functioning, understand immune deficiency diseases, AIDS and its vaccines and Autoimmunity</p>
	ZOL3C08-	DEVELOPMENTAL BIOLOGY & ENDOCRINOLOGY	<p>C01 Integrating knowledge in various aspects and process in development of organisms and expose the learners to the new developments in embryology and its relevance to man.</p> <p>C02 Provide advanced knowledge about growth and development of multicellular organisms.</p> <p>C03 Understand how fertilization occur, how fertilized egg divide in regulated manner to grow into full size body, how the cells formed in this process communicate in meaningful way to become different from each other, thus assembling into tissues and complex organs.</p> <p>C04 Understand about stem cells and its importance in various therapies like replacement of cartilage in arthritis.</p> <p>C05 knowledge about influence of environmental disruptions in reproduction and development.</p> <p>C06 All these knowledge have important role in infertility management and birth defect regulation</p> <p>C07 Help to learn about major endocrine glands of our body</p> <p>C08 Understand about location of various glands, its structure, secretory role, mechanism of action, its importance etc.</p>

			<p>CO9 Understand about the role of each hormone for managing health issues related to metabolism, excretion, nervous communication, reproduction etc.</p>
	ZOL3E09 -	MORPHOLOGY AND TAXONOMY	<p>CO1 Understand the origin and evolution of insects CO2 Understand about the basic classification Insects CO3 Explain the salient features of external morphology of insects CO4 Detailed description of insects ecology and behavior are conceived</p>
IV	ZOL4C10-	BIOTECHNOLOGY & MICROBIOLOGY	<p>CO1 Demonstrate Isolation of Plasmid DNA, Familiarize different vectors; Demonstrate Cloning, Demonstrate Electrophoresis of DNA, PCR and Bacterial transformation, Detailing on molecular probes and molecular markers CO2 Demonstrate Electrophoresis, Blotting techniques, FISH and GISH, Detailing on DNA Hybridization, DNA sequencing and detection and applications of markers. CO3 Understand about DNA markers, DNA isolation, DNA fingerprinting, Gene therapy and applications of biotechnology in Transplantation, Antenatal diagnosis and Forensic medicine. CO4 Understand Transfection methods, Transgenic animals. IVF, Gene silencing and Pollution control using biotechnology CO5 Detection of bacterial strain by gram staining, Isolation and</p>

			<p>enumeration of bacteria</p> <p>C06 Understand microbes and its growth, diseases caused by microbes and its control.</p> <p>C07 Perform testing of contamination of milk and sterilization procedures, Quantitative and qualitative analysis of microbes, Water quality analysis and culture maintenance of E.Coli.</p>
	ZOL4E11-	ANATOMY AND PHYSIOLOGY	<p>C01 gained the knowledge about the external morphology of the insect body and their appendages and functions.</p> <p>C02 acquired the knowledge to understand the various modification and adaptations such as head, legs, wings, antennae, mouthparts, abdomen, sense organs.</p> <p>C03 Developed a sound knowledge on basic aspects of anatomy of different systems, elementary physiology, nutritional physiology and their application in entomology.</p> <p>C04 Gained hands-on-training on the different internal systems such as digestive system, circulatory system, reproductive system and nervous system.</p> <p>C05 Understand the different types of system and their modifications in insects.</p> <p>C06 Understand the different types of nutrition and diet</p> <p>C07 Become familiar with the physiological systems in insects as outlined</p>

			<p>C08 Identify the influence that neural and hormonal controls have within each system.</p>
	ZOL4E12-	AGRICULTURAL, MEDICAL & FORENSIC ENTOMOLOGY	<p>C01 Appreciate the influence that insects have (both positive and negative) on human society, including human health, agriculture, and the environment</p> <p>C02 Knows the main factors which regulate the insect population dynamics, insect spreading, types of damage to plants by insects and classification of insect pests.</p> <p>C03 Familiarize the life history and nature of damage of insect pests that cause loss to major field crops and principles and methods of their effective management.</p> <p>C04 Learn about the structure, mode of action, classification and formulation of insecticides and also about insecticide resistance, degradation and impact on human health and wild life.</p> <p>C05 Understand the salient features of insects of public health importance and those used in forensic entomology.</p>