RAJAH SERFOJI GOVERNMENT COLLEGE (Autonomous)
THANJAVUR 613005

CBCS Pattern **B.Sc. Zoology** (Applicable to the candidates admitted from the academic year 2018-2019)	
Programme Specific Outcomes	
Students who complete B.Sc. degree in Zoology will study and acquire complete knowledge on zoology and allied science also. On completion of the course, they will expertise in their field and able to have competitive advantage in pursuing higher studies from India or abroad; and seek jobs in academia, research or industries related to biological sciences. Understand major group of fauna and able to classify them systematically. Appreciate fundamentals of animal sciences and comprehend the interactions among various organisms and the environment in which animals live. Recognize various concepts of genetics and their importance to human health. Acquire knowledge on some of the applied field of zoology viz. aquaculture, sericulture and poultry farming to enhance the employability skills of learners.	
I Semester	
Subject Code	CC1: Invertebrata
S1Z1	✓ Familiarize diverse form of invertebrates animals belong to major nine phyla with classical examples. ✓ Gain knowledge about the type's study of each phylum external features, nutrition, locomotion and life cycle. ✓ Demonstrate the basic knowledge of life cycle of various parasites, ecological significance, economic importance and their special adaptation for their efficient survival. ✓ Critically distinguish various structure and function of invertebrate animals and their evolutionary significance. ✓
S1ZP1	CC2: Major Practical I
	✓ Have the knowledge and skills to: understand the systemic functions, importance of selected organisms both living and preserved specimens of invertebrates. ✓ Develop and apply knowledge of basic laboratory skill, principle of microscopy, structural organization of mouth parts of cockroach, body setae and penial setae of the earthworms. ✓ Demonstrate and illustrate the various body systems (digestive and nervous) of earthworms, cockroach and prawn.
II Semester	
S2Z2	CC3: Chordata
	✓ Get knowledge on classification and characteristic features of chordates ✓ Know the structure and its function of various organs of chordates ✓ Get knowledge about the birds and mammals ✓ Gain more information on comparative study in Chordates
S2ZP2	CC4: Major Practical II
	✓ Able to dissect out different systems of Chordata such as Fish, Frog,

	Calotes, Pigeon and Rabbit. ✓ Identified and Classify the specimens which are present in the department lab ✓ Have knowledge about the systematic position of Chordates
III Semester	
S3Z3	CC5: Cell and Molecular Biology
	After completion of this course, the students would have learned the following subject area well versed in the ✓ Principle and functions of microscope. ✓ Anatomy and physiology of cells and organelles. ✓ Ultra structural functions of nucleus with reference to chromosomes. ✓ Mechanisms of cell divisions. ✓ Types of DNA and RNA. ✓ Mechanisms of protein synthesis. ✓ Mechanisms of carcinogenesis. ✓ Aging and cell death. Types and mechanisms of mutation
S3ZP3	CC6: Major Practical III
	After completion of this course, the students would have learned the following subject area well versed. ✓ Measurement of cells. ✓ Staining technique for identification of different cells ✓ Preparation and analysis of giant chromosomes. ✓ Observation of cell divisions. ✓ Analysis of blood cells and haemocytes. ✓ Vaginal smear preparations and analysis.
S3SB1D	SB1: Aquaculture
	✓ Able to express the basic features of aquaculture and construction procedures for fish farms and identify different fish farming methods ✓ Able to manage water quality and gain knowledge of nutrition important for growth and health ✓ Gain knowledge about the culture techniques of major carps which helps in the production of healthy food for human consumption ✓ Know the causes, control and mitigation of fish disease ✓ detailed knowledge about harvesting, transport and preservation techniques
IV Semester	
S4Z4	CC7: Environmental Biology and Evolution
	On successful completion of this course students will be able to: ✓ Gain consolidated knowledge about ecosystem, habitats, various factors influencing ecosystem, dynamic nature of minerals, population ecology and its balance. ✓ Develop their knowledge in relation to origin of life on the basis of historical prospects and scientific evidences. ✓ Critically evaluate and understand the concept of speciation, evolution and animal extinction.
S4ZP4	CC8: Major Practical IV
	Upon successful completion, students will have the knowledge and skills to: ✓ Explain the structure of community in an ecosystem and their diversified life. ✓ Develop and apply knowledge and skills in implement experimental

	strategies to investigate different water quality analysis skills pertaining to ecosystem. ✓ Critically assess biological information and apply it to theoretical, experimental and professional contexts. ✓ Describe the different ecological fauna, interactions with its environment and describe the important processes like adaptations, mimicry governing the dynamics of animal communities. ✓ Examine, summarise and evaluate scientific evidence integrate central ideas underpinning evolutionary patterns and processes based on homologous, analogous organs and fossilization ✓
S4SB2F	SB2: Sericulture
	On completion of this course the student will ✓ Have knowledge on the development of sericulture in the world and in India ✓ Know the method of mulberry plantation ✓ Have the idea of sericulture industry and moriculture ✓ Start seri-business
V Semester	
S5Z5	CC9: Animal Physiology and Biochemistry
	On completion of this course the student will have an idea in ✓ the digestive system and understand the general digestive process in man. ✓ know to excretory system, structure of Kidney and it's Function. ✓ know their structure of Heart, pumping mechanism and types. ✓ nervous system and explain the control mechanism of entire body activities.
S5ZP5	CC10: Major Practical V
	On Successful completion of course student will be able to... ✓ develop and apply knowledge and skills in implement experimental strategies to investigate different parameters of blood, saliva and excretory materials. ✓ familiarize the principle and application of various instruments pertaining to physiological ✓ measurement, Sterilization and vectors. ✓ experience the qualitative measurement of macro molecules. ✓ gain consolidated knowledge on Mendelian principles with a classical example of drosophila. ✓ able to develop hands on experience about microbial media preparation, Identification of bacteria by staining techniques and human blood grouping.
S5ZEL1A	MEC1: Genetics
	✓ To predict the characteristics of offspring produced by parents. ✓ understand the chromosome structural variation results from the chromosomal breakage. ✓ Know the concept of mutation they can understand the function of cells and metabolic regulations. ✓ By microbial genetics, the genetics of the disease causing micro organisms are identified and helpful in controlling diseases. ✓ By studying the XY chromosomes of human, it is clarified that male determines the sex of the offspring.

S5ZEL1B	MEC1: Medical Laboratory Techniques
	Upon successful completion of the Medical Laboratory Technician, the student should be able to: ✓ Perform routine clinical laboratory procedures within acceptable quality control parameters in Hematology, Chemistry, Immunohematology, and Microbiology under the general supervision of a Clinical Laboratory Scientist or Pathologist. ✓ Demonstrate technical skills, social behavior, and professional awareness incumbent upon a laboratory technician ✓ Operate and maintain laboratory equipment, utilizing appropriate quality control and safety procedures. ✓ Perform within the guidelines of the code of ethics
S5ZEL2A	MEC2: Microbiology & Immunology
	Course outcome: Students completing this course will be able to ✓ Describe the organization of microbes and basic bacterial culture techniques. ✓ Outline food microbiology, nitrogen and sulphur cycle and industrial microbiology. ✓ Summarise historical developments of immunology and immunity types. ✓ Appreciate lymphoid organs and immune system cells. ✓ Outline immunoglobulins, antigen-antibody interactions, immunodeficiency disorders.
S5ZEL2B	MEC2: Animal Behaviour
	After successful completion of this course, students should be capable of: ✓ Understanding and identifying the behaviors in a variety of taxa and the types of behaviour. ✓ Competently discuss the evolutionary origins of various behaviors. ✓ Designing and implementing experiments to test hypotheses relating to animal behavior.
S5SB3	SB3: Poultry Farming
	After successful completion of this course the student will ✓ Management of growers and layers by maintain the optimum rearing conditions (brood temperature, space, feed, water, debeaking and vaccination etc.) ✓ Able to express the basic idea of feed stuffs. proximate principles of feed. ✓ Understand the Important disease of poultry, such as (Ranikhets, fowlpox, avian leucosis, tick fever , tuberculosis , fowl cholera , infectious coryza) ✓ Recognize the Nutritive value of egg and meat and economic importance of poultry farming.
S5ZEC	ECC1: Biology of Insects
	On completion of biology of insect, sstudents should be able to ✓ define the key concepts relating to insect biology and evolution. ✓ classify and identify insects to the level of Order. ✓ have knowledge of insect morphology, biology, behavior, and ecology ✓ appreciate the environmental importance of insects ✓ familiar with the health and economic impacts of insects on humans
VI Semester	
S6Z6	CC11: Developmental Biology

	✓ Students should understand the relationship between their experiments and concept covered in class. ✓ Students aware of the reproductive health. ✓ Be prepared to teach fundamental all developmental biology. ✓ Be prepared to learn the organogenesis. ✓ Students understand to techniques of cryopreservation and embryo of different species
S6Z7	CC12: Biostatistics and Computer Applications
	On completion of this course the students will: ✓ gain knowledge about data, types of data, data classification and tabulations with presentation of data ✓ Understand various tools & techniques used in biological systems and apply them in their research. ✓ gain knowledge about statistical methods like measures of central tendencies, hypothesis testing and inferential statistics ✓ have acquire knowledge on computers and basics of computer operation and its applications
S5ZEC	ECC1: Biology of Insects
	On completion of biology of insect, sstudents should be able to ✓ Define the key concepts relating to insect biology and evolution. ✓ Classify and identify insects to the level of Order. ✓ have knowledge of insect morphology, biology, behavior, and ecology ✓ appreciate the environmental importance of insects ✓ familiar with the health and economic impacts of insects on humans
S6ZP6	CC13: Major Practical VI
	On Successful completion of course student will be able to... ✓ Statistical analysis of biological sample and come into a conclusion about the sample. ✓ Have knowledge on computers and basics of computer programmes especially word processor ✓ Know the developmental stages of birds ✓ Have a basic knowledge on biotechnology and application of biotechnology in various fields
S6ZEL3A	MEC3: Biotechnology
	✓ To understand principles of biotechnology, gene cloning and ethical issues ✓ Familiarization of the terms associated with Animal tissue culture and understand to laboratory techniques of biomolecular and immunological techniques ✓ know applications in the different domains of enzyme biotechnology and biosensor. ✓ Briefing the specializations in the field of industrial biotechnology viz.,bioprocessing and single cell culture ✓ Learn about the role of environmental biotechnological applications
S6ZEL3B	MEC3: Economic Entomology
	On successful completion of this course students will be able to: ✓ Identify the basic elements of insect pest in economically important crops, pests of stored products and their management. ✓ Outline the scientific method of pesticide classification, non-conventional

	and quarantine methods of insect pest management of crops. ✓ Apply the principles of integrated pest management for ecological balance by maintaining economic threshold levels. ✓ Familiarize beneficial insects, pollinators, soil builders, scavengers and bio-control agents in managing insect pests. ✓ Assess the insect vectors, mode of transmission and epidemiology with reference to human diseases.
S6ZEC	ECC2: Aquarium Fish Keeping
	On completion of this course student enables to ✓ set aquarium ✓ student enables to manage the home as well as commercial aquariums ✓ learn to handle different aquarium equipment and decorations of aquarium ✓ do breeding of Aquarium Fishes and have knowledge about various techniques of ornamental fish breeding, rearing and its marketing to make them self-sustainable.

Sl. No	Code	Course	Title	Staff in charge
I Semester				
S1AZ1	Allied 1: Allied Zoology			
	A student completing a major in Biotechnology shall be able to apply: ✓ To understand principles of biotechnology, gene cloning and ethical issues ✓ Familiarization of the terms associated with Animal tissue culture and understand to laboratory techniques of biomolecular and immunological techniques ✓ Felt applications in the different domains of enzyme biotechnology and biosensor. ✓ Briefing the specializations in the field of industrial biotechnology viz.,bioprocessing and single cell culture ✓ Learn about the role of environmental biotechnological applications			
S2AZ2	Allied 2: Commercial Zoology			
	On completion of this course ✓ the students will have knowledge about the Vermiculture. ✓ The students will able to understand the Apiculture. ✓ The students will have ability to the Sericulture practice. ✓ The students will able to work effectively and respectively with diverse team during Fish culture practice. ✓ The students will acquire knowledge in Poultry management			
S2APZ2	Allied 3: Allied Practical			
	A student completing a major in Allied Zoology-I shall be able to apply: ✓ Overview of living system of invertebrates, different life forms and Maintenance in modelling organism of Cockroach. ✓ Fundamental understanding of chordate: modelling organism of fish and rat of living system ✓ Understanding of structure and function of human reproductive cell and development stage embryonic cells system. ✓ Understanding the Basic of cellular transport system of organism. ✓ Flow of information in evolutionary biological system-theories, mimicry and distribution			

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CBCS Pattern

Course Structure for M.Sc. Zoology

(Applicable to the candidates admitted from the academic year 2018-2019)

Programme specific outcomes

Develop knowledge and skill to pursue frontier area of research or teaching as career.
Appreciate the value of faunal diversity and environmental conservation.
Widen the scope of students that may helpful to enhance employability.
Build up an attitude with scientific ethics and temper.
Face and succeed in high level competitive examinations like CSIR-NET, SLET, UPSC etc

Code	Course Outcomes
	I Semester
S1PZO1	CC1: Animal Phyologeny & Biodiversity
	On successful completion of this course students will be able to: ✓ Gain demonstrable and measurable knowledge on the phylogeny, origin and evolution of invertebrates and their significance. ✓ Describe the phylogeny of jawless and jawed vertebrate, evolutionary position and their geological time scale. ✓ Outline the origin of amphibians, reptiles, primates, adaptive radiation of lemuroids and evolutionary knowledge on Australopithecus. ✓ Critique conservation of biodiversity by in situ and ex situ methods, biodiversity laws of India and wildlife protection act.
S1PZO2	CC2: Cell and Molecular Biology
	After completion of this course, the students would be well versed in the following disciplines. ✓ Cellular transports systems. ✓ Receptors and Cell signaling. ✓ Genomic structure of the cells. ✓ Synthesis and functions of genes. ✓ Types of DNA and RNA. ✓ Mechanisms of protein synthesis. ✓ Methods of cell culture and cell lines. ✓ Valuable products from cell culture.
S1PZO3	CC3: Biochemistry and Biotechniques
	Upon successful completion, students will have: ✓ Knowledge and skills to understand in detail the structure and physico chemical properties of carbohydrates from monosaccharide to polysaccharides. ✓ Learn the significance of structural and storage polysaccharides in nature. Understand in detail about amino acid structures, types of amino acids, classifications, structure of proteins and types of proteins. ✓ Describe the lipids are metabolized, cholesterol, prostaglandins etc. Understand the difference between the water soluble and fat soluble vitamins and the knowledge on the clinical consequences of nutritional deficiency.

	✓ Demonstrate the basic knowledge the principle and applications of centrifuge, electron microscopy, SEM, TEM, STEM and chromatography technique based on the principle involved in the separation of protein. ✓ Understand the principles and apply basic techniques of electrophoresis, autoradiography, spectrophotometer, scintillation counter, colorimeter, spectrophotometer and atomic absorption spectrophotometer.
S1PZOP1	CC4: Major Practical I
	Students completing this course will be able to ✓ Have an idea an evolutionary aspects of animals and the know process of fossilization. ✓ Able to operate/use basic laboratory equipment ✓ Perform cell division study and acquire practical knowledge on cell divisions ✓ Carry out data basic haematological anlaysis ✓ Quantify proximate composition of biological tissues
S1PZOEL1A	EC1: Sericulture and Apiculture
	On completion of this course students ✓ acquire knowledge about sericulture and their cultural practices. ✓ get idea about diseases of silkworm and marketing the silk products ✓ learn knowledge about the mulberry silk rearing methods in Tamil Nadu ✓ able to understand the different bee species in India and their practices ✓ get knowledge about beekeeping techniques and their management's practices.
S1PZOEL1B	EC1: Wild Life Management
	On completion of this course the student will ✓ understand and have knowledge on modern concepts in wildlife management, ✓ have an insight into relevant conservation policies and legislation and their enforcement mechanism at Global and Local Level, ✓ experience in the use of modern scientific methods, techniques and tools that are required for biodiversity assessment and monitoring of conservation goals ✓ Develop skills on scientific wildlife management planning, and resolving human wildlife conflict including capture, handling, care and management of wild animals.
II Semester	
S2PZO4	CC5: Genetics
	On completion of this course the students will ✓ Understand the molecular basis of gene interaction. ✓ Know the linkage analysis which is genetically used to identify the diseases inherited through genes. ✓ Have the knowledge on the mechanism of inheritance and the genetic material and its transfer methods. ✓ Able to know the diagnosis of chromosomal disorders
S2PZO5	CC6: Developmental Biology
	On completion of this course students ✓ understand the relationship between their experiments and concept developmental biology

	✓ aware of the reproductive health. ✓ learn the organogenesis. ✓ understand to techniques of cryopreservation and embryo of different species. ✓ Know the IVF and cryopreservation techniques.
S2PZO6	CC7: Animal Physiology
	On completion of this course the student will learn ✓ the digestive system students and understand the general digestive process in man. ✓ know the excretory system, structure of Kidney and its function. ✓ Understand the function of circulatory system ✓ Study the nervous system and its control over the entire body activities.
S2PZOP2	CC8: Major Practical II
	✓ Demonstrate an understanding of fundamental concept in genetics. ✓ To know knowledge on crossing over during meiotic divisions and ask to measure the linkage percentage. ✓ Understand the basic concept of developmental biology, how fertilization and cleavage occur. ✓ The process and consequence of gastrulation. ✓ Concept of organogenesis, growth, regeneration and ageing. ✓ Compare the different energy requirements of an animal at rest and during exercise and regulation of the oxygen transport system. ✓ To understand the process of nervous system and sensory perception
S2PZOEL2A	EC2: Aquaculture & Vermiculture
	On completion of this course students will ✓ Acquire knowledge about the species selection for aquaculture, water quality parameters and kinds of aquaculture ✓ Able to express the basic ideas of site selection, construction procedures for fish farm, types of ponds, maintaining water quality and different types of feeds ✓ Recognize the types of culture, various diseases of fish ✓ Understanding the different kinds of worm farming and also the potential of vermicompost as an alternative to chemical fertilizers Gain knowledge about the role of vermiculture in protecting the environment and managing the waste and also the economic importance of vermiculture
S2PZOEL2B	EC2: Fishery Biology
	On completion of this course students will ✓ Gain knowledge on agro based small scale industries like fish farming. ✓ Understand the rearing techniques of fin and shell fishes. ✓ Practice methods for fish culture. ✓ Know the economic importance of fishes. ✓ Practice fish breeding
III Semester	
S3PZO7	CC9: Biotechnology and Nanotechnology
	Course outcome: Students completing this course will be able to ✓ Recognise gene cloning, gene cloning tools, transgenic animals, animal cloning and biotechnological regulations. ✓ Summarise animal cell culture and useful products of this technique. ✓ Explain animal cell culture scale-up processes, stem cells and organ

	culture methods. ✓ Appreciate various molecular biological techniques. ✓ Give an account of various nanomaterials and their preparations.
S3PZO8	CC10: Research Methodology
	Upon completion of the course the student shall be able to: ✓ Use research data to formulate or evaluate new research questions, using reason and persuasion in a logical argument. ✓ Summarize and evaluate a body of research including primary literature, and can compare methods with other disciplines ✓ Analyze the biological data that he collects during his research study ✓ Understand the need for ethics in conduct of research program ✓ Understand the different types or formats of scientific communications ✓ Prepare a project proposal for funding and a manuscript for publication
S3PZO9	CC11: Computer Applications & Bioinformatics
	A student completing a major in computer applications and bioinformatics shall be able to apply: ✓ Grasp the facts about the basic structure of a computer. ¬ Comprehend the aspects of the basic concept of operational software and application software ✓ Perceive the details about the database and its retrieval and tools through internet. ✓ knowledge and awareness of the basic principles and concepts of biology, computer science and mathematics ✓ To characterize the bioinformatics database – primary and secondary databases of protein and nucleotide. ✓ existing software effectively to extract information from large databases and to use this information in computer modelling and an understanding of structure-function relationships, information theory, gene expression, and database queries.
S3PZOP3	CC12: Major Practical III
	Course outcome: Students completing this course will be able to ✓ Isolate DNA, separate protein by SDS-PAGE, separate DNA by agarose gel electrophoresis. ✓ Perform literature collection, research report preparation, Chi-square and Students 't' test. ✓ Carry out data analysis and graph generation using MS Excel ✓ Do DNA sequence analysis using bioinformatics tool. ✓ Identify, collect and preserve beneficial and harmful insects.
S3PZOEL3A	EC3: General &Applied Entomology
	Outcome ✓ By studying Entomology students can know the order of insects and their external characters. ✓ Entomology will give a knowledge regarding the beneficial and Harmful insects. ✓ Integrated pest management will give an idea towards the control measurements of Harmful insects to the agricultural crops.
S3PZOEL3B	EC3: Poultry Farming
	On completion of this course the student will ✓ get basic information on various aspects of poultry farming and its role rural economy

	✓ understand the incubation and hatching, brooding management ✓ Have develop knowledge on the concept, rearing and management of growers and layers. ✓ Know importance of different feedstuffs and their poximate composition and nutritive values ✓ Know to identify poultry diseases. Prevention (including vaccination schedule) and control of important diseases in poultry. ✓ Gaining the knowledge of Marketing the meat and eggs from the poultry farming, and increase the national economy
IV Semester	
S4PZO13	CC13: Immunology
	Upon completion of this course, the students will be able to: ✓ Demonstrate the basic knowledge of immunological processes at a cellular and molecular level, the key mechanisms of innate, adaptive immunity and how they relate. ✓ Discuss the properties of antigens, importance of haptens, adjuvants and explain the structure, properties, types and functions of antibodies. ✓ Elucidate the types of hypersensitivity reactions, MHC, activation of complements and its biological significances. ✓ Outline key events in immunological disorders, transplantation immunology and autoimmune diseases. ✓ Understand the principles and apply basic techniques for identifying antigen antibody interactions
S4PZOP4	CC14:
	Course outcome: Students completing this course will be able to ✓ Perform culture media preparation, various bacterial culture and staining techniques. ✓ Carry out enumeration of bacterial colonies by serial dilution. ✓ Identify lymphoid organs in mouse and determine human blood group. ✓ Outline the principle of immunodiffusion and immunoelectrophoresis. ✓ Estimate water quality parameters and recognise the equipment used for such analysis. Analyse fossils, variation in finger print pattern and describe evidences of evolution.
S4ZOPW	CC15: Project Work
S4PZOEL4A	EC4: Microbiology
	Students completing this course will be able to ✓ Explain classification and characteristics of microbes. ✓ Describe bacterial culture and sterilization techniques. ✓ List out human pathogens. ✓ Give an account of aeromicrobiology. ✓ Apply the principle of bacterial examination of water & microbial sewage treatment methods.
S4PZOE4B	EC4: Endocrinology
	After completion of this course, the students would be well versed in the following disciplines. ✓ Basics on diversity invertebrate and vertebrate hormones. ✓ Biosynthesis of hormones. ✓ Mechanism of hormone actions. ✓ Diseases associated with level of hormones.

	✓ Hormone therapy. Industrial preparation of hormones.
S4PZOE5A	EC5: Environmental Biology & Evolution
	Student completing this course will be able to. ✓ Describe the structure of Eco systems, biota, and Nutrient cycles. ✓ Summarise the biotic community, Ecological succession and population. ✓ Explain the various type of pollution and Environmental Impact Assessment ✓ Elucidate the origin of life, evidence of evolution and Darwinism. ✓ Summarise the evolution of man, horse, mimicry, colorations and adaptive radiation.
S4PZOEL5B	EC5: Ecodevelopment & Ecotourism
	✓ Acquire the knowledge of principals of ecotourism and its applications. ✓ Get idea about the sources of eco development areas and need their protection ✓ Understand how to form natural and eco clubs and their managements. ✓ Get idea about the self-help groups and private funding agencies and their sources ✓ Learn about this introduction of syllabus monitoring the biosphere reserves and devolving the environmental education to all

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M. Phil. Zoology
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Course Code	Course
	I Semester
S1MZO1	CC1: Research Methodology
	On completion of this course the student will ✓ demonstrate intermediate statistical theory and methods ✓ familiar with core content of at least one area in biological sciences: for example- genetics. ✓ be able to formulate and perform a descriptive and inferential analysis of biological data using statistical software. ✓ reshape the data for analysis using a programming or statistical language ✓ interpret the findings and have the ability of written and oral presentation of results/findings
S1MZO2	CC2: Bioinstrumentation and Biological Techniques
	After completion of this course, the students would be well versed in the following disciplines. ✓ Working principles of various bio instruments. ✓ Working principles of various bio instruments. ✓ Advanced instruments used in high end technology ✓ Applications of bio instruments in various fields such as microbiology, biochemistry and molecular biology. ✓ Structural prediction compounds at molecular level.

	✓ Diagnostic applications of medical instruments such as PCR, microscopes, angiography and mammography.
S1MZO3	CC3: Teaching and Learning Skills
	✓ The learner will be able to understand the operating methods of computers and their accessories. ✓ The learns will able to know the ICT tools and their applications in teaching skills. ✓ The students will get acquires knowledge about advanced application of different teaching aids through computer. ✓ The learns acquired wise knowledge about pedagogy methods used through advance ICT methods. ✓ The students will develop the knowledge about EDUSAT and their uses. ✓ The students will be able to apply the principles of computer applications in applied sciences.
CC4: Guide Paper	
S1MZOA	CC4: Applied Entomology
	On completion of this course the researcher able to ✓ Identify main pest species belonging to class of Insecta on agricultural/medicinally important insects based on the symptoms of the attack and morphological traits. ✓ Describe life cycles and ecology of main pest/vector species belonging to class of Insecta. ✓ Plan and implement non-pesticide indirect and direct measures to prevent or reduce pest attack. ✓ Plan and implement plant protection according to the IPM principles.
S1MZOB	Pheromone Technology
	On successful completion of this paper the scholars will gain knowledge on ✓ The classification, types and nature of the pheromones ✓ The effect of primer and releaser pheromones in the aquatic organisms ✓ The role of pheromones in the integrated pest management and also they know the merits and demerits of pheromones in pest management. ✓ The importance of pheromones in the reproductive behaviour of farm animals. ✓ The handling of various bio instruments related to identifying the odorant binding proteins. ✓
S1MZO4C	Aquatic Toxicology
	Student completing this course will be able to. ✓ Explain the aquatic and thermal pollution ✓ Elucidate the metabolism of toxic substance, synergetic and antagonistic effects. ✓ Recognize the heavy metal, and pesticide pollution. ✓ Analysis the LC50 and LD50 values. ✓ Summaries the sublethal toxicity on biochemical composition and histological alternations.
S1MZO4D	Bioremediation
	Course outcome: Students completing this course will be able to ✓ Compare and contrast bioremediation approaches and explain the advantages and factors influencing bioremediation. ✓ Describe bioremediation processes and genetic engineering approaches.

	✓ Recognise the role of biotechnology in pollution control. ✓ Outline liquid and solid waste management and limitations of bioremediation. ✓ Give and account of industrial and mining waste treatments.
S1MZO4E	Fish Feed Formulation and Fish Culture Techniques
	✓ Understand feeding standard, various livestocks. ✓ Describe and discuss method of fish died formulation. ✓ Identify the purpose of premix how it can be formulated and included in died. ✓ Fish provide nutrition and micro nutrients that are essential to physical development in children. ✓ Describe the role of protein, fat, carbohydrate, vitamin in fish nutrients.
S1MZO4F	Aquatic Science and Fisheries
	On completion of this course the scholar will ✓ contribute effectively as part of a team in order to achieve common goals ✓ demonstrate and appreciation of work practices relating to aquatic biological studies ✓ demonstrate skill at identifying organisms found in marine and aquatic environments ✓ Understand the dynamics of aquatics ecosystems and their potential responses to changes ✓ apply conservation and management principles for conservation and sustainable use of aquatic resources.
S1MZO4G	Probiotics and Its Application
	At the end of the course the students will be able to: ✓ Critically evaluate products containing probiotics, both from a microbiological and technological point of view. ✓ Furthermore, students will be able to establish the most suitable criteria for the selection of a microorganism to be used as a probiotic and Prebiotic and for the scientific evaluation of its effectiveness. ✓ Briefing the specializations in the field of diary and Non diary Probiotics food product and food safety ✓ Understanding of structure and function of human intestine and development of beneficial microorganism. ✓ Learn about the techniques and its applications of probiotic products on food
S1MZO4H	Ecotoxicology and Radiation Biology
	On completion of this course, students should be able to: ✓ Understand and appreciate abiotic and biotic factors, General Principles of Toxicology- Bioassay, Toxicant effects major living and non-living components of regional and global environment. ✓ Critically evaluate the heavy metal, Petroleum related compounds, oil pollutants and thermal pollutions in aquatic and terrestrial organisms. ✓ Describe basic knowledge about sources, types and specific units for various measurements and dosimetric calculations of ionizing radiations. ✓ Understand the measurement principles and accumulation pattern of selected radiation in water, nuclear energy programmes and its waste management. ✓ Gain consolidated knowledge about primordial radionuclides, HBRA and application of radiation in oncology.
S1MZO4I	Clinical Biochemistry and Microbiology
	After completion of this course, the students would be well versed in the following disciplines. ✓ Types and properties of proteins

	✓ Immunoglobulins and antimicrobial peptides ✓ High end techniques for protein/ peptide detection ✓ Common human pathogens ✓ Consequences of multidrug resistance in pathogenic microbes ✓ Bacterial and fungal culture techniques

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