ISLAMIAH WOMEN'S ARTS AND SCIENCE COLLEGE
Permanently Affiliated to Thiruvalluvar University
Recognized by UGC under section 2(f) and 12(B) of UGC Act 1956
Accredited with "B" Grade by NAAC
Approved by the Government of Tamil Nadu
Phone:04174-235266 Email:principaliwc@gmail.com
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DEPARTMENT OF ZOOLOGY

PSOs and Cos

DEPARTMENT OF ZOOLOGY

REGULATION 2023-2024

PROGRAM SPECIFIC OUTCOME (PSOs)

PSO1 – Placement: To prepare the students who will demonstrate respectful engagement with others' ideas, behaviors, beliefs and apply diverse frames of reference to decisions and actions.

PSO 2 - Entrepreneur: To create effective entrepreneurs by enhancing their critical thinking, problem solving, decision making and leadership skill that will facilitate startups and high potential organizations

PSO3 – Research and Development: Design and implement HR systems and practices grounded in research that comply with employment laws, leading the organization towards growth and development.

PSO4 – Contribution to Business World: To produce employable, ethical and innovative professionals to sustain in the dynamic business world.

PSO 5 – Contribution to the Society: To contribute to the development of the society by collaborating with stakeholders for mutual benefit

SEMESTER I

COURSE: INVERTEBRATA I Credits: 4

CO1: Understand the basic concepts of invertebrate animals and recall its structure and functions.
CO2: Illustrate and examine the systemic and functional morphology of various groups of invertebrata.
CO3: Differentiate and classify the animal‟s mode of life in various taxa and estimate the biodiversity.
CO4: To compare and distinguish the various physiological processes and organ systems in lower animals.
CO5: Infer and integrate the parasitic and economic importance of invertebrate animals.

COURSE: INVERTEBRATA II Credits: 4

CO1: Classify, Identify and recall the name and distinct features of invertebrate groups.

CO2: Explain, and relate the origin, structural organization and evolutionary aspects of invertebrates.
CO3: Analyze, compare and distinguish the developmental stages and describe the important biological process.
CO4: Correlate the interaction of invertebrates with humans and critique its economic importance.

CO5: Summarize the physiology, ecological adaptations to stimulate and integrate the significance of invertebrates to the environment, humans, and agriculture.

COURSE: FOUNDATION COURSE Credits: 2

CO1: Be able to understand the distinct features of invertebrate and chordate life forms.
CO2: Will understand the role of cell and their organelles.
CO3: Students will understand the basis of genetics.
CO4: Be aware on the different fields of microbiology

COURSE: INVERTEBRATA LAB COURSE Credits: 3

CO1: Identify and label the external features of different groups of invertebrate animals.

CO2: Illustrate and examine the circulatory system, nervous system and reproductive system of invertebrate animals.

CO3: Differentiate and compare the structure, function and mode of life of various groups of animals.
CO4: To compare and distinguish the dissected internal organs of lower animals.
CO5 Prepare and develop the mounting procedure of economically important invertebrates.

COURSE: AQUARIUM KEEPING Credits: 2

CO1: Students to learn about different ornamental fishes and identify the diseases of them
CO2: To develop entrepreneur potential in the field of aquarium and get self-employment.

ALLIED CHEMISTRY Credit 3

CO1: state the theories of chemical bonding, nuclear reactions and its applications.
CO 2: evaluate the efficiencies and uses of various fuels and fertilizers.
CO 3: explain the type of hybridization, electronic effect and mechanism involved in the organic reactions.
CO 4: demonstrate the structure and uses of antibiotics, anaesthetics, antipyretics and artificial sugars.
CO 5: analyse various methods to identify an appropriate method for the separation of chemical components.

SEMESTER II

COURSE: CHORDATA Credit: 5

CO1: Classify, Identify and recall the name and distinct features of different subphylum belonging to phylum Chordata.

CO2: Explain, and relate the origin, structural organization and evolutionary aspects of vertebrates.

CO3: Analyze, compare and distinguish the developmental stages and describe the important biological process.

CO4: Correlate the different modes of life and parental care among different vertebrates. PO3,

CO5: Summarise the morphology and ecological adaptations in vertebrates and list out the economic importance.

COURSE: CHORDATA LAB COURSE Credit: 3

CO1 Identify and recall the name and distinct external and internal features of animals belonging to phylum Chordata.

CO2 Explain the structural organization of various organs and systems in different classes of vertebrates.

CO3 Analyse, compare and distinguish the morphological features and developmental stages of chordates

CO4 Dissect and explain various organs and internal systems in different vertebrates and correlate its function.

CO5 Summarise the morphology and ecological adaptations in vertebrates and list out the economic importance.

COURSE: ALLIED CHEMISTRY II Credit: 3

CO 1: write the IUPAC name for complex, different theories to explain the bonding in coordination compounds and water technology.

CO 2: explain the preparation and property of carbohydrate.

CO 3: enlighten the biological role of transition metals, amino acids and nucleic acids.

CO 4: apply/demonstrate the electrochemistry principles in corrosion, electroplating and fuel cells.

CO 5: outline the various type of photochemical process.

COURSE: ALLIED CHEMISTRY PRACTICAL Credit: 3

CO 1: gain an understanding of the use of standard flask and volumetric pipettes, burette.

CO 2: design, carry out, record and interpret the results of volumetric titration.

CO 3: apply their skill in the analysis of water/hardness.

CO4: analyze the chemical constituents in allied chemical products

COURSE: ORNAMENTAL FISH FARMING& MANAGEMENT Credit: 2

CO1: The students will be able to identify, culture, maintain and market the commercially important ornamental fishes.

CO2: The knowledge and skills gained on the different aspects of ornamental fish keeping will enable the students to develop entrepreneurship potential and help in self- employment

COURSE: ECONOMIC ZOOLOGY **Credit: 2**

CO1: To identify the breeds and varieties of poultry, fish, bees, and cattle and understand the basic aspects of farming.

CO2: To assess and integrate the available tools and techniques to increase the productivity in farms.

CO3: To Analyse the pros and cons of different methods of farming and marketing strategies of products.

CO4: To evaluate the use of available resources in improving the breeds, vermicomposting, farm products etc.

CO5: To design new methods to improve farm animals with increased productivity and disease resistance and to construct new methods in vermicomposting.

REGULATION 2022-2023

PROGRAM SPECIFIC OUTCOME (PSOs)

PSO1: Students enrolled in B.Sc. degree program in Zoology will study and acquire complete knowledge of disciplinary as well as allied biological sciences.

PSO2: At the end of graduation, they are likely to possess expertise, which will provide them competitive advantage in pursuing higher studies from India or abroad; and seek jobs in academia, research or industries.

PSO3: Students will be able to define and explain major concepts in the biological sciences.

PSO4: They are able to correctly use biological instrumentation and proper laboratory techniques. Students will be able to communicate biological knowledge in oral and written form.

PSO5: Students will be able to identify the relationship or synchronization between structure and function at all levels: molecular, cellular, and organismal. Students should be able to identify, classify and differentiate diverse chordates and nonchordates based on their morphological, anatomical and systemic organization.

PSO6: They will also be able to describe economic, ecological and medical significance of various animals in human life.

PSO7: This will create a curiosity and awareness among them to explore the animal diversity and take up wild life photography or wild life exploration as a career option.

PSO8: Students undertaking skill enhancement courses like aquaculture, sericulture and apiculture will inculcate skills involved in rearing fish, bees and silk moth which would help them in starting their own ventures and generating self-employment making them successful entrepreneurs

PSO9: Acquire skills in diagnostic testing, haematology, histopathology, staining procedures etc. used in clinical and research laboratories will provide them opportunity to work in diagnostic or research laboratory.

PSO10: Candidates find opportunities in government departments, environmental agencies, universities, colleges, biotechnological, pharmaceutical, environmental/ecological fields.

PSO11: There are numerous career opportunities for candidates completing their B.Sc.,

M.Sc. and Ph.D. in Zoology in public and private sector. Candidates may find jobs as Animal Behaviourist, Conservationist, Wildlife Biologist, Zoo Curator, and Wildlife Educator.

SEMESTER I

COURSE: INVERTEBRATES Credit 4

CO1: Students will be able to summarise the general characters, classify the animals of the phylum Protozoa. Understand and illustrates life history of Protozoans parasites.

CO2: Students will be able to summarise the general characters, classify the animals of the phylum Porifera and Coelenterata. Understands and illustrates life history of Sycon and Obelia. Narrates Polymorphism in Coelenterata.

CO3: Students will be able to summarise the general characters, Classify the animals of the phylum Helminthes and Annelida. Understands and illustrates parasitic adaptations and life history of Taenia solium - able to explains all the systems in Neries.

CO4: Students will be able to summarise the general characters,classify the animals of the phylum Arthropoda. Narrates all the systems of Prawn. Illustrate the affinities of Peripatus.

CO5: Students will be able to summarise the general characters, classify the animals of the phylum Mollusca and Echinodermata. Understands and illustrates life history of Freshwater mussel and Sea star. Illustrate the larval forms of Echinodermata and their significance.

ALLIED CHEMISTRY Credit 3

CO1: Students will be able to gain knowledge about Foundational understanding of metallurgical principles, including the extraction of metals from minerals and ores.

CO2: Student will able to be Proficiency in organic chemistry concepts, including the preparation of cycloalkanes

CO3: Student will able to analyse the Comprehension of Chemical Kinetics and Catalysis

CO4: Student will able to understand the Application of Molecular Structure and Fuels Knowledge.

CO5: Students will able to understand the Nuclear Chemistry and Petroleum

CO6: Students will able to Familiar with Semiconductor Materials.

COURSE: ENVIRONMENTAL STUDIES Credit 2

CO1: Imparts knowledge to the student regarding environment and conservation biology.

CO2: Gains knowledge in the areas of responses to Laws of limiting factor, Laws of minimum, Laws of Tolerance and Tragedy of commons

CO3: Types of ecosystem – freshwater, marine and terrestrial,

CO4: Population characteristics and dynamics – conceptual approach

COURSE: PROFESSIONAL ENGLISH FOR LIFE SCIENCE Credit 3

CO 1: Students will be enabled to understand the basic objective of the course by being acquainted with specific dimensions of communication skills i.e. Reading, Writing, Listening, Thinking and Speaking.

CO 2: Students would be able to create substantial base by the formation of strong professional vocabulary for its application at different platforms and through numerous modes as Comprehension, reading, writing and speaking etc.

CO 3: Students will apply it at their work place for writing purposes such as Presentation/official drafting/administrative communication and use it for document/project/report/research paper writing.

CO 4: Students will be made to evaluate the correct & error-free writing by being well-versed in rules of English grammar & cultivate relevant technical style of communication & presentation at their work place & also for academic uses.

SEMESTER II

COURSE: CHORDATA Credit:4

CO1: Student will be able to facilitate the students to understand basics of Phylum Chordata uptoorders.
CO2: Student will be able to learn the General characters and classification of Pisces up to orders
CO3: Student will be able to make the students Familiar with General Characters and classification up to order level
CO4: Student will be able learn the General characters and classification of Aves up to orders.

CO5: Student will be able to make the students Familiar with General Characters and classification of Mammals up to order level.

CORE PRACTICAL I: INVERTEBRATA AND CHORDATA Credit: 2

CO1: Student will be able to dessect and display various systems of invertebrates an chordates

CO2: Student will be able to mount the mouth parts, appendages of prawn, boy setae of earthworm an placoid scales of shark.
CO3: Student will be able to understand the adaptations of animals to their respective modes of life
CO4: Student will be able to understand the biological significance of animals
CO5: Student will be able to understand theoesteology.

ALLIED CHEMISTRY Credit 3

CO1: Students will able to understand the nomenclature of coordination compounds and identify ligands, central metal ions, and complex ions.

CO2: Students will able to analyse the preparation, properties, and uses of cellulose derivatives, amino acids, and proteins in industries such as leather tanning and textile manufacturing.

CO3: Students will able to understand the concept of pH, pH determination methods, and the importance of buffer solutions in living systems.

CO4: Students will able to identify the components of paints and classify pigments and dyes based on their colour and constitution.

CO5: Students will able to understand the principles of electrochemical corrosion, its prevention methods, and applications of electroplating in various industries.

COURSE: VALUE EDUCATION Credit 2

CO 1 Students will understand the importance of value based living.

CO 2 Students will gain deeper understanding about the purpose of their life.

CO 3 Students will understand and start applying the essential steps to become good leaders.
CO 4 Students will become value based professionals.

COURSE: PROFESSIONAL ENGLISH FOR LIFE SCIENCE Credit 3

CO1: Attend interviews with boldness and confidence.

CO2: Adapt easily into the workplace context, having become communicatively competent.

CO3: Apply to the Research & Development organizations/ sections in Companies and offices with winning proposals.

PRACTICAL

COURSE: CORE PRACTICAL - I Credit: 2

CO1. The student will be able to dessect and display various systems of invertebrates an chordates
CO2.The student will be able to mount the mouth parts, appendages of prawn,boy setae of earthworm an placoid scales of shark.
CO 3. The student will be able to understand the adaptations of animals to their respective modes of life
CO4. The student will be able to understand the biological significance of animals
CO5.The student will be able to understand theoesteology

SEMESTER III

COURSE: CELL AND MOLECULAR BIOLOGY Credit :4

CO 1: the student will be able to understand the Principles of microscopes ,Cytological techniques and to describe theCell theory, Ultra structure of animal cell .

CO2: the student will be able to recognize the properties of cytoplasm ,cell cycle , cell division, Ultra structure andfunctions cell organelles.

CO3: After studied unit-3, the student will be able to get knowledge on biochemical and cell culture techniques

COE: the student will be able to understand the structure and function of chromosomes,giant chromosomes, DNA andtypes of RNA.

CO5: the student will be able to describe the mechanism of DNA replication and Protein synthesis.

COURSE: ALLIED BOTANY Credit 3

CO 1. To knowledge of cell and cell organelles

CO 2. To know classification and structure of tissues

CO 3. To understand characters and reproduction of bacteria and viruses

CO 4. To acquire knowledge of algae and fungi

CO 5. To study the structure and life cycle of some bryophytes, pteridophytes and gymnosperms.

COURSE: FOOD AND NUTRITION Credit 2

CO1: Realizing the fact that “Food as medicine”, Classify carbohydrates and analyze their sources and functions in the body

CO2: Classify fats and analyze their sources and functions in the body

CO3: Identify and explain proteins in foods and the specific functions in maintaining health.

CO4: Identify the types of vitamins and their biomedical significance of vitamins present in food

CO5: Analyzing the biological importance of major and minor trace elements (Minerals) in the food.

COURSE: VERMICULTURE CREDIT :2

CO 1: The Student Will Be Able To Learn About The Characteristics And Biology Of Earthworm.
CO2. After Studied Unit-2, The Student Will Be Able To Get An In Depth Knowledge About The Culture Techniques.
CO3: The Student Will Be Able To Understand About The Methods Of Composting.
CO4: The Student Will Be Able To Learn The Factors For Proper Maintenance Of The Vermicomposting Beds.
CO5: The student will be able to Learn about the application and marketing of the compost.

SEMESTER IV

GENETICS AND BIOTECHNOLOGY Credit 4

CO1: The student will be able to study effectively, and enable to understand the difference between dominance and epistasis, to enable the students understand types of blood groups in humans.

CO2: The student will be able to describe gene linkage and explain the genetic anomalies caused by changes in chromosome number and structure. To understand the fine structure of genes and gene regulations.

CO3: The student will be able explain DNA mutation and repair mechanisms and different kinds of mutagens and kinds of mutagens. To understand the animal breeding techniques, population structure and genetic polymorphisms.

CO4: The student will be able to determine the applicability of difference kinds of cloning vectors, techniques of genetic engineering, illustrating the use of genomic libraries in gene detection and characterization.

CO5: The student will be able to analyse the function of applied genetic research in technology, nature and society, understanding the applications of rDNA technology, and identifying the ethical issues related to gene manipulation.

COURSE: ALLIED BOTANY Credit 3

CO1: To familiarize range of characters and economic importance of some families.

CO2: To know structure of mature anther and types of ovules

CO3: To understand physiology mechanisms of plant.

CO4: To acquire knowledge of ecosystem and environmental pollution

CO5:To study the Mendel's test of monohybrid and dihybrid, evolutionary theories

COURSE: LIFESTYLE DISEASES & PREVENTION Credit 2

CO1: Define a Balanced Diet. Understand the importance of vitamins and minerals
CO2: Identify Lifestyle Prone Disorders
CO3: Manage physiological and psychological disorders
CO4: Categorize Communicable and Non-Communicable Disease

PRACTICAL

COURSE: CORE PRACTICAL - II Credit: 3

CO1. The student will be able to do cytometrical analysis
CO2. The student will be able to perform blood smear prepapration
CO3.The student will be able to study the histological slides
CO4.The student will be able to do Genetics experiments
CO5.The student will be able to understand the biotechnological techniques

SEMESTER V

COURSE: BIOSTATISTICS AND BIOINFORMATICS Credit 6

CO1: To Define Biostatistics and list out the Scopes of Biostatistics

CO2: To determine the value of mean, the median, the mode of grouped data, identifying the relationship among the three measures of central tendency for systematical and skewed distributions, advantages and disadvantages of the three measures.

CO3: They could be able to do File Operations New, Save & Print - Editing: Cut, copy, Paste, Find and Replace Insert: Page numbers and Pictures - Format: Font, Bullet & Numbering etc.

CO4: To get introduced to the basic concepts of Bioinformatics

CO5: They could able to outline the application areas for multiple sequence Pair wise sequence Alignment

COURSE: DEVELOPMENTAL BIOLOGY & IMMUNOLOGY Credit 6

CO1: The student will be able to study ontogenesis, the development of animals including parthenogenesis.

CO2: The student will be able to study embryonic adaptations, human reproduction and reproductive technology in man.

CO3: The student will be able to study the process of immune response and mechanism.

CO4: The student will be able to understand the advances in Immunology.

CO5: The student will be able to understand the role of development in defining biological process.

COURSE: ANIMAL PHYSIOLOGY Credit 5

CO1: The student will be able to understand macromolecules of food and their importance, understand the digestion and metabolism.

CO2: The student will be able to understand important and mechanism-respiration,

CO3: The student will be able to understand Excretion and Osmoionoregulation

CO4: To acquire the knowledge about nervous system muscles and muscle contraction

CO5**:** The student to acquire the knowledge about Receptors Endocrine system and disorders,

INTERNAL ELECTIVE

COURSE: NANOTECHNOLOGY IN LIFE SCIENCE Credit 3

CO 1: Understand the basics of nanotechnology.

CO 2: Get knowledge about the levels and devices in nanotechnology.

CO 3: Acquire knowledge about Nano techniques at molecular level.

CO 4: Learn the evaluation of nanomaterial.

CO 5: Learn about the application of nanomaterial in various fields.

SKILL BASED SUBJECT

COURSE: ANIMAL BEHAVIOUR Credit 2

CO1: Student should be capable of understanding and identify behaviour in a variety of taxa.

CO2: Competently discuss the evolutionary origins of various behaviours.

CO3: Designing and implementing experiment to test hypothesis relating to animal behaviour.

CO4: To demonstrate knowledge of key concepts in animal behaviour.

CO5: To exhibit quantitative research skills.

SEMESTER VI

COURSE: ENVIRONMENTAL BIOLOGY Credit 5

CO1: The student will be able to understand Scope, concept, Branches in ecology and Environmental factors (soil, light, temperature, water and air).

CO2: The student will be able to understand fundamental units of ecosystem, Tropic levels of ecosystem and Food chain.

CO3: The student will be able to understand Bio geochemical cycles and importance of inter relationship between every organism and environment

CO4: To acquire the knowledge about population and community ecology, ecological succession, aims of wild life conservation and Natural resources.

CO5:The student will acquire the knowledge environmental hazards, Environmental ethics and laws.

COURSE: ECONOMIC ZOOLOGY Credit 5

CO1: Understanding the role of worm farming in modern farming,potential of vermicompost,maintaining health of the soil,economic importance of Vermiculture and role of Vermiculture in protecting the environment.

CO2: They could able to understand Techniques of induced breeding,Commercial culture of catla& cat fish

CO3: They could understand about area of poultry production including nutrition,health welfare and product quality

CO4: To provide basic input to students about production, planning and management of diary farms Milch breeds. Draught breeds, Dual purpose breeds and New Cross breeds of Cows and Buffaloes in India.

CO5: The students could able to learn the Future strategies for Livestock Development

INTERNAL ELECTIVE

COURSE: EVOLUTION Credit 3

CO1: The students will understand the basic concepts of evolution

CO2: The students will understand various theories of evolution

CO3: The students will have a comprehensive knowledge regarding various Sources of Variations and their role in evolution

CO4: The student will have an adequate knowledge about Micro- evolutionary changes. Speciation and Adaptive Radiation.

CO5: The students will have a descriptive knowledge regarding Origin and Evolution of Man.

INTERNAL ELECTIVE

COURSE: BIOCHEMISTRY Credit 3

CO1: To learn and understands the various properties of water

CO2: To understand the bioenergetics

CO3: To know about classification, metabolism and biological significance of carbohydrate, protein and lipids

CO4: To learn properties, classification, nomenclature and action of enzymes

CO5: To learn biochemistry of antibiotics

CO6: To learn about principles and application of instruments

SKILL BASED SUBJECT

COURSE: MEDICAL LABORATORY TECHNOLOGY Credit 2

CO1: The student will be able to understand the sterilization techniques.

CO2: The student will be able to apply and analyse the haematalogical parameters.

CO3: The student will be able to diagnose different diseases.

CO4: The student will be able to analyse the physical examination of urine and faeces.

CO5: The student will be able to get a thorough knowledge about cerebro-spinal fluid.

PRACTICAL

COURSE: CORE PRACTICAL - III **Credit: 3**

CO1. After studied unit-1, the student will be able to solve biostatistic problems.

CO2. The student will be able to understand experimental physiology

CO3.The student will be able to understand experimental Developmental biology

CO4.The student will be able to understand Immunological techniques

CO5. After studied unit-5, the student will be able to record the experimental findings.

COURSE: CORE PRACTICAL - IV **Credit: 3**

CO1. The student will be able to perform ecological experiments

CO2. The student will be able to identify the parasites of fish and cultivable earthworms

CO 3.The student will be able to identify the larvivorous fish and pest

CO 4.The student will be able to identify the fossils of evolutionary importance

CO5.The student will be able to Record their findings

REGULATION 2020-2021

PROGRAM SPECIFIC OUTCOME (PSOs)

PSO1. Understand the nature and basic concepts of cell biology, genetics, taxonomy, physiology, ecology and applied Zoology

PSO2. Analyse the relationships among animals, plants and microbes

PSO3. Perform procedures as per laboratory standards in the areas of Taxonomy, Physiology, Ecology, Cell biology, Genetics, Applied Zoology, Clinical science, tools and techniques of Zoology, Toxicology, Entomology, Nematology Sericulture, Biochemistry, Fish biology, Animal biotechnology, Immunology and research methodology

PSO4. Understand the applications of biological sciences in Apiculture, Aquaculture, Agriculture and Medicine

PSO5. Gains knowledge about research methodologies, effective communication and skills of problem solving methods

PSO6. Contributes the knowledge for Nation building.

PSO7. The students will have the knowledge to minimize the environmental issues like global warming, pollution, degradation of natural resources, and helps in conservation endangered species, afforestation etc.

PSO8. The students will able to apply their knowledge of biological sciences in various disciplines like vermiculture, mushroom culture, aquaculture, apiculture, agriculture and medicine. And contribute the knowledge for Nations development.

COURSE OUTCOMES

SEMESTER I

COURSE: INVERTEBRATES Credit 4

CO1 Describe general taxonomic rules on animal classification

CO2 Classify Protista up to phylum using examples from parasitic adaptation

CO3 Classify Phylum Porifera to Echinodermata with taxonomic keys

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CO4 Imparts knowledge regarding the various Invertebrates species and the regulatory processes.

COURSE: ENVIRONMENTAL STUDIES Credit 2

CO1: Imparts knowledge to the student regarding environment and conservation biology.

CO2: Gains knowledge in the areas of responses to Laws of limiting factor, Laws of minimum, Laws of Tolerance and Tragedy of commons

CO3: Types of ecosystem – freshwater, marine and terrestrial,

CO4: Population characteristics and dynamics – conceptual approach

COURSE: PROFESSIONAL ENGLISH FOR LIFE SCIENCE Credit 3

CO 1: Students will be enabled to understand the basic objective of the course by being acquainted with specific dimensions of communication skills i.e. Reading, Writing, Listening, Thinking and Speaking.

CO 2: Students would be able to create substantial base by the formation of strong professional vocabulary for its application at different platforms and through numerous modes as Comprehension, reading, writing and speaking etc.

CO 3: Students will apply it at their work place for writing purposes such as Presentation/official drafting/administrative communication and use it for document/project/report/research paper writing.

CO 4: Students will be made to evaluate the correct & error-free writing by being well-versed in rules of English grammar & cultivate relevant technical style of communication & presentation at their work place & also for academic uses

SEMESTER II

COURSE: VERTEBRATES Credit 4

CO1: Imparts conceptual knowledge of vertebrates, their adaptations and associations in relation to their environment

CO2: Classify phylum Protochordates to Mammalia

CO3: Gains knowledge of functional anatomy of vertebrates from Fishes to Mammals.

CO4: Students will be able to list out the unique characters of Fishes. Amphibians, Reptiles, Aves and Mammals

COURSE: VALUE EDUCATION Credit 2

CO 1: Students will understand the importance of value based living.

CO 2: Students will gain deeper understanding about the purpose of their life.

CO 3: Students will understand and start applying the essential steps to become good leaders.

CO 4: Students will become value based professionals.

COURSE: PROFESSIONAL ENGLISH FOR LIFE SCIENCE

Credit 3

CO1: Attend interviews with boldness and confidence.

CO2: Adapt easily into the workplace context, having becomeCommunicatively competent.

CO3: Apply to the Research & Development organisations/ sections inCompanies and offices with winning proposals.

SEMESTER III

COURSE: CELL AND MOLECULAR BIOLOGY **Credit 4**

CO 1: Acquire knowledge about the history basic techniques in cytology and molecular biology.

CO 2: Get an in depth knowledge about the cell structure.

CO 3: Learn about the cell organelles and their functions.

CO 4: Understand the cell cycle and learn about cancer biology.

CO 5: Learn about the nucleic acid and protein synthesis.

COURSE: ALLIED BOTANY **Credit 3**

CO 1. To knowledge of cell and cell organelles

CO 2. To know classification and structure of tissues

CO 3. To understand characters and reproduction of bacteria and viruses

CO 4. To acquire knowledge of algae and fungi

CO 5. To study the structure and life cycle of some bryophytes, pteridophytes and gymnosperms.

COURSE:VERMICULTURE Credit 2

CO 1: Learn about the characteristics and biology of earthworm.

CO 2: Get an in depth knowledge about the culture techniques.

CO 3: Understand about the methods of composting.

CO 4: Learn the factors for proper maintenance of the vermicomposting beds.

CO 5: Learn about the application and marketing of the compost.

COURSE: FOOD AND NUTRITION Credit 2

CO1: Realizing the fact that "Food as medicine", Classify carbohydrates and analyze their sources andfunctions in the body

CO2: Classify fats and analyze their sources and functions in the body

CO3: Identify and explain proteins in foods and the specific functions in maintaining health.

CO4: Identify the types of vitamins and their biomedical significance of vitamins present in food

CO5: Analyzing the biological importance of major and minor trace elements (Minerals) in the food.

SEMESTER IV

GENETICS AND BIOTECHNOLOGY Credit 4

CO1: The student will be able to study effectively, and enable to understand the difference between dominance and epistasis, to enable the students understand types of blood groups in humans.

CO2: The student will be able to describe gene linkage and explain the genetic anomalies caused by changes in chromosome number and structure. To understand the fine structure of genes and gene regulations.

CO3: The student will be able explain DNA mutation and repair mechanisms and different kinds of mutagens and kinds of mutagens. To understand the animal breeding techniques, population structure and genetic polymorphisms.

CO4: The student will be able to determine the applicability of difference kinds of cloning vectors, techniques of genetic engineering, illustrating the use of genomic libraries in gene detection and characterization.

CO5: The student will be able to analyse the function of applied genetic research in technology, nature and society, understanding the applications of rDNA technology, and identifying the ethical issues related to gene manipulation.

COURSE: ALLIED BOTANY Credit 3

CO1: To familiarize range of characters and economic importance of some families.

CO2: To know structure of mature anther and types of ovules

CO3: To understand physiology mechanisms of plant.

CO4: To acquire knowledge of ecosystem and environmental pollution

CO5: To study the Mendel's test of monohybrid and dihybrid, evolutionary theories

COURSE: APICULTURE Credit 2

CO1: The students will be able to understand the Basics of beekeeping

CO2: The students will be able to understand the role of Bee hive

CO3: The students will be able to understand the Bee enemies, diseases, pesticide poisoning

CO4: The students will be able to understand the Products of bee keeping

CO5: The students will be able to understand the Economics and Marketing

COURSE: LIFESTYLE DISEASES & PREVENTION Credit 2

CO1: Define a Balanced Diet. Understand the importance of vitamins and minerals

CO2: Identify Lifestyle Prone Disorders

CO3: Manage physiological and psychological disorders

CO4: Categorize Communicable and Non-Communicable Disease

SEMESTER V

COURSE: BIOSTATISTICS AND BIOINFORMATICS Credit 6

CO1: To Define Biostatistics and list out the Scopes of Biostatistics

CO2: To determine the value of mean, the median, the mode of grouped data, identifying the relationship among the three measures of central tendency for systematical and skewed distributions, advantages and disadvantages of the three measures.

CO3: They could be able to do File Operations New, Save & Print - Editing: Cut, copy, Paste, Find and Replace Insert: Page numbers and Pictures - Format: Font, Bullet & Numbering etc.

CO4: To get introduced to the basic concepts of Bioinformatics

CO5: They could able to outline the application areas for multiple sequence Pair wise sequence Alignment

COURSE: DEVELOPMENTAL BIOLOGY & IMMUNOLOGY Credit 6

CO1: The student will be able to study ontogenesis, the development of animals including parthenogenesis.

CO2: The student will be able to study embryonic adaptations, human reproduction and reproductive technology in man.

CO3: The student will be able to study the process of immune response and mechanism.

CO4: The student will be able to understand the advances in Immunology.

CO5: The student will be able to understand the role of development in defining biological process.

COURSE: ANIMAL PHYSIOLOGY Core Paper – 7 Credit 5

CO1: The student will be able to understand macromolecules of food and their importance, understand the digestion and metabolism.

CO2: The student will be able to understand important and mechanism-respiration,

CO3: The student will be able to understand Excretion and Osmoionoregulation

CO4: To acquire the knowledge about nervous system muscles and muscle contraction

CO5**:** The student to acquire the knowledge about Receptors Endocrine system and disorders

INTERNAL ELECTIVE

COURSE: NANOTECHNOLOGY IN LIFE SCIENCE Credit 3

CO 1: Understand the basics of nanotechnology.

CO 2: Get knowledge about the levels and devices in nanotechnology.

CO 3: Acquire knowledge about Nano techniques at molecular level.

CO 4: Learn the evaluation of nanomaterial.

CO 5: Learn about the application of nanomaterial in various fields.

SKILL BASED SUBJECT

COURSE: ANIMAL BEHAVIOUR Credit 2

CO1: Student should be capable of understanding and identify behaviour in a variety of taxa.

CO2: Competently discuss the evolutionary origins of various behaviours.

CO3: Designing and implementing experiment to test hypothesis relating to animal behaviour.

CO4: To demonstrate knowledge of key concepts in animal behaviour.

CO5: To exhibit quantitative research skills.

SEMESTER VI

COURSE: ENVIRONMENTAL BIOLOGY Core paper – 8 Credit 5

CO1: The student will be able to understand Scope, concept, Branches in ecology and Environmental factors (soil, light, temperature, water and air).

CO2: The student will be able to understand fundamental units of ecosystem, Tropic levels of ecosystem and Food chain.

CO3: The student will be able to understand Bio geochemical cycles and importance of inter relationship between every organism and environment

CO4: To acquire the knowledge about population and community ecology, ecological succession, aims of wild life conservation and Natural resources.

CO5: The student will acquire the knowledge environmental hazards, Environmental ethics and laws.

COURSE: ECONOMIC ZOOLOGY Core paper – 9 Credit 5

CO1: Understanding the role of worm farming in modern farming,potential of vermicompost,maintaining health of the soil,economic importance of Vermiculture and role of Vermiculture in protecting the environment

CO2: They could able to understand Techniques of induced breeding,Commercial culture of catla & cat fish

CO3: They could understand about area of poultry production including nutrition,health welfare and product quality

CO4: To provide basic input to students about production, planning and management of diary farms Milch breeds. Draught breeds, Dual purpose breeds and New Cross breeds of Cows and Buffaloes in India.

CO5: The students could able to learn the Future strategies for Livestock Development

INTERNAL ELECTIVE

COURSE: EVOLUTION Credit 3

CO1: The students will understand the basic concepts of evolution

CO2: The students will understand various theories of evolution

CO3: The students will have a comprehensive knowledge regarding various Sources of Variations and their role in evolution

CO4: The student will have an adequate knowledge about Micro- evolutionary changes. Speciation and Adaptive Radiation.

CO5: The students will have a descriptive knowledge regarding Origin and Evolution of Man.

INTERNAL ELECTIVE

COURSE: BIOCHEMISTRY Credit 3

CO1: To learn and understands the various properties of water

CO2: To understand the bioenergetics

CO3: To know about classification, metabolism and biological significance of carbohydrate, protein and lipids

CO4: To learn properties, classification, nomenclature and action of enzymes

CO5: To learn biochemistry of antibiotics

CO6: To learn about principles and application of instruments

SKILL BASED SUBJECT

COURSE: MEDICAL LABORATORY TECHNOLOGY Credit 2

CO1: The student will be able to understand the sterilization techniques.

CO2: The student will be able to apply and analyse the haematalogical parameters.

CO3: The student will be able to diagnose different diseases.

CO4: The student will be able to analyse the physical examination of urine and faeces.

CO5: The student will be able to get a thorough knowledge about cerebro-spinal fluid.