

Department of Life Science

Programme Specific Outcomes (PSO)

1. Recognize and appreciate the essential concepts, principles, and processes in basic, applied areas of biological science.
2. Enables the student to appreciate biodiversity, conservation, and the importance of environmental sustenance.
3. Plan and execute biological sciences experiments, analyze and interpret data collected using appropriate methods, report accurately the findings of the experiment and draw logical inferences.
4. Core competencies such as (i) communication skills required to articulate thoughts and ideas, and to present information and explanations in a well-structured and logical manner (ii) scientific writing, and (iii) data analysis.
5. Demonstrate professional behavior such as ethics, and moral values in the workplace and social life.
6. Enables the students to integrate the curriculum into life requirements and empower them to be efficient teachers and researchers.

Course Title: Animal and Plant Diversity - I semester

Course Outcomes (CO)

1. Describe the body diversity, special features and adaptive characters of invertebrates
2. Explain the adaptive features of vertebrates and the relation with the environment.
3. Demonstrate knowledge of adaptive characteristics and interesting features of major vertebrate animal groups.
4. Recognize the basis of Bentham and Hooker's system of classification.
5. Learn the rules of the International Code of Botanical Nomenclature.
6. Describe the characteristic features of a few dicotyledonous families of plants.
7. Explain the interesting features of some plants belonging to Monocot families.

Course Title: Biomolecules - I semester

Course Outcomes (CO)

1. Explain the structure and metabolism of carbohydrates.
2. Derivation of protein structure and its interactions.
3. Describe amino acid metabolism.
4. Classify lipids based on structure and explain their biological role.
5. Describe lipid metabolism.
6. Explain nucleotide synthesis and degradation

Course Title: Cell Biology – I semester

Course Outcomes (CO)

1. Get an in-depth knowledge of the cell as a basic unit of life. Learn the ultra-structure and functions of various cell organelles.
2. Describe the various transport mechanisms of the cell.
3. Recognize various aspects of cell signaling. Appreciate the importance of communication between cells and various cell receptors.
4. Explain secondary messengers and cell signaling pathways.
5. Explain the process of mitosis and meiosis. Learn the importance of chromosomes in the process of cell division.
6. Recognize the role of cyclins and protein kinases in regulating the cell cycle as well as the importance of cell cycle checkpoints.
7. Describe the mechanism and importance of programmed cell death.

Course Title: Genetics - I semester

Course Outcomes (CO)

1. Explain various types of gene interactions and their effects on the phenotype.
2. Recognize the concepts involved in multiple allelism, sex-linked inheritance and pleiotropism.
3. Apply the concept of non-disjunction of chromosomes and its effects on the phenotype.
4. Explain the various mechanisms of extra-nuclear inheritance.
5. Describe the mechanisms involved in the determination of sex in man and others organisms.
6. Comprehend various aspects of human genetics and their relevance in medicine.
7. Demonstrate the importance of genetics in plant breeding and its impact on agriculture.
8. Apply the concepts of linkage and crossing over and their significance.

Course Title: Biostatistics - I semester

Course Outcomes (CO)

1. Construct and analyze diagrammatic and graphical displays to summarised data.
2. Compute and interpret measures of center and spread of data.
3. Calculate, interpret and communicate the simple correlation and simple linear regression.
4. Utilize basic concepts of probability to calculate, interpret and communicate event probabilities. Determine the appropriate probability distribution based on experimental conditions and assumptions to evaluate probability.
5. Understand the goal of hypothesis testing and the basic structure of a hypothesis test, basic terminology including how to set up the null and alternative hypotheses, how to determine the possible outcomes of a hypothesis test and how to decide between these possible outcomes.

Course Title: Instrumentation and Lab techniques - I semester

Course Outcomes (CO)

1. Explain the principle, construction and application of different types of microscopes used to study the morphology of microbes.
2. Describe the working principle of different types of centrifuge and rotor designs.
3. Explain bio – physical techniques used for characterization of bio- molecules.
4. Discuss the application of electrophysiological methods used in diagnosis.

Course Title: Basic Microbiology – II semester

Course Outcomes (CO)

1. Explain the classification, structure and function of microorganisms.
2. Explain the various metabolic pathways in microorganisms.
3. Explain the methods used for microbial culturing and preservation techniques.
4. Describe the pathogenicity of pathogenic organism.
5. Explain the structure, classification and methods of cultivating viruses.

Course Title: Human Physiology – II semester

Course Outcomes (CO)

1. Explain the physiology of the cardiovascular, nervous, respiratory, digestive, muscular and skeletal system and sensory perception from a regional perspective and the disorders associated to the organ systems.
2. Appreciate the roles of sensory organs.
3. Describe the structure and functions of the digestive and excretory system.
4. Explain the cardiovascular system and its functions.
5. Explain the structure and functions of the central and peripheral nervous system.
6. Explain the various disease conditions associated with the various organ systems.

Course Title: Plant Physiology – II semester

Course Outcomes (CO)

1. Explain the various physiological processes taking place in plants.
2. Explain the concepts related to water and mineral absorption in plants.
3. Appreciate the metabolic pathways involved in physiological processes like photosynthesis, respiration and nitrogen fixation.
4. Explain the role of plant growth hormones and photoreceptors.
5. Appreciate the various types of biotic and abiotic stresses and their effects in plants.
6. Explain the various chemical defenses (alkaloids, glycosides, terpenes and phenolics) used by plants.

Course Title: Immunology – II semester

Course Outcomes (CO)

1. Explain the basics of immune system and elucidate the biochemical basis of immunological responses and genetic basis of diversity
2. Describe mechanisms of protection against various diseases and principles governing vaccination
3. Demonstrate the basic knowledge of allergic responses; types of allergies.
4. Explain the antigen and antibody interactions.
5. Demonstrate an understanding on the disorders and deficiencies associated with immune system functioning and immunotherapy.

Course Title: Research Methodology – II semester

Course Outcomes (CO)

1. Enable students to identify the overall process of designing a research study from its inception to its report.
2. Enable to can select and define appropriate research problem, organize and conduct research in a structured manner.
3. Enable the students to prepare a project proposal, to write a research report, articles and thesis in a decipherable manner.

Course Title: Environmental Science – II semester

Course Outcomes (CO)

1. Explain the source, impact and control measures of air pollution. Describe working principle and applications of air pollution control equipments.
2. Recognise and understand water pollution sources and discuss the methodologies involved in waste water treatment.
3. Describe the methods of municipal solid waste management.
4. Explain the process of municipal solid waste management.
5. Describe the effect of environmental toxicology.

Course Title here: Applied Microbiology – III semester

Course Outcomes (CO)

1. Explain the components of industrial media and design of fermentors.
2. Describe the methods of screening industrially important organisms and production of fermentation products.
3. Demonstrate the microbiology of dairy products and understand their therapeutic value.
4. Explain the factors influencing the growth of microbes in food, study food borne diseases and understand the various microbial examination and food preservation techniques.
5. Demonstrate the knowledge on air microbiology, various air sampling techniques and understand biohazards in occupational environments.
6. Define rhizosperic effects; their beneficial role on plants; their use as biofertilizers and biopesticides and role of soil microbes in leaching of metals

Course Title: Molecular Biology - III semester

Course Outcomes (CO)

1. Understand various concepts related to molecular biology including DNA and RNA structure, DNA replication, transcription and translation.
2. Explain the structure and functions of nucleic acids.
3. Describe the mechanism of DNA replication and recombination.
4. Describe the types of mutations, mutagens and DNA repair mechanisms.
5. Explain the mechanism involved in transcription including mRNA synthesis and processing.
6. Describe the mechanisms involved in translation (initiation, elongation and termination), including ribosome structure and its role in peptide synthesis. Understand the characteristics and features of the genetic code.

Course Title: Human Endocrinology and Reproductive Biology - III semester

Course Outcomes (CO)

1. Demonstrate an understanding of the endocrine organ system – structure and functions. The role of the hormones in maintaining body function. The student will demonstrate knowledge of the major disorders associated with the gland
2. Demonstrate an understanding of the basic action of hormones, role of secondary messengers and biosynthesis and role of steroid hormones and prostaglandins.
3. Appreciate the reproductive system and accessory glands – structure and functions; gametogenesis and fertilization process.
4. Appreciate the process of placental development, development of the fetus and parturition.
5. Describe the basic biological events (cleavage, gastrulation and implantation) of early human development
6. Appreciate the basic knowledge of developmental anomalies, neonatal distress, and reproductive anomalies and assisted reproductive technology.

Course Title: Plant Developmental Biology and Plant Diseases - III semester

Course Outcomes (CO)

1. Describe the process of microsporogenesis in plants along with the study of various aspects of pollen grains.
2. Explain the process of megasporogenesis and organization of the female gametophyte.
3. Appreciate the concept of double fertilization that is unique to angiosperms.
4. Explain the process of embryogenesis in plants and understand the role of the endosperm.
5. Identify the role of some bacterial and fungal diseases of plants.

Course Title: Animal Tissue Culture - III semester

Course Outcomes (CO)

1. Apply the basic concepts of laboratory layout, media preparation, sterilization and factors influencing cell culture.
2. Explain various cell culture techniques, cell maintenance and preservation.
3. Describe the concept of stem cells and tissue engineering techniques.
4. Explain the methods of transgenesis and cloning.
5. Appreciate applications of animal biotechnology.
6. Describe the bio - safety procedures and bioethics needed for tissue culture

Course Title: Plant Tissue Culture - III semester

Course Outcomes (CO)

1. Explain the basic laboratory organization, culture media, various culturing methods and germplasm conservation.
2. Demonstrate the various transformation techniques.
3. Describe the roles of DNA technology, plant cell as biofactories for the production of Secondary metabolites.
4. Explain the antisense technology and its applications.
5. Explain the concepts of bioethics, GMP and GLP.

Course Title: Basic Bioinformatics- III semester

Course Outcomes (CO)

1. To understand important biological databases and to articulate the biological data.
2. To examine and relate various computational methods to analyse protein sequences.
3. To deconstruct the methods of phylogenetic analysis.
4. To predict the structure of proteins using various computational tools.

Course Title: Pet Behaviour and Care (MDC) – III semester

Course Outcomes (CO)

1. Appreciate the role of pets; ethics in animal keeping
2. Explain the life cycle of dogs, breeding, pup selection, food preference and vaccination profile.
3. Explain the life cycle of cats, breeding, and food preference and vaccination profile.
4. Describe the life cycle, breeding and common diseases of fishes and birds.

Course Title: r-DNA Technology – IV semester

Course Outcomes (CO)

1. Appreciate the scope and importance of recombinant DNA technology.
2. Explain the methods used to analyze nucleic acids and proteins.
3. Explain the various vectors, hosts and tools used in molecular cloning.
4. Explain the methods in labeling nucleic acids and proteins.
5. Describe the methods used to construct and screen DNA libraries.
6. Appreciate the principle and procedure involved in various techniques used in recombinant DNA technology

Course Title: Clinical Biochemistry and Diagnostics - IV semester

Course Outcomes (CO)

1. Explain enzyme chemistry and its classification.
2. Appreciate enzymes as a diagnostic tool.
3. Explain the carbohydrate, lipid and protein metabolism and the associated abnormalities.
4. Explain the biological roles of metal ions.
5. Describe the different organ function tests.
6. Appreciate the clinical applications of radioisotopes.

Course Title: Food and Fermentation Technology- IV semester

Course Outcomes (CO)

1. Demonstrate the need for Food Safety and understand the concepts of food adulteration and guidelines to used food additives
2. Explain the importance of functional foods
3. Explain the various concepts of fermentation
4. Demonstrate the role of microbial and biochemical factors in spoilage of foods
5. Recognize and understand the beneficial roles of microbes in fermentations
6. Explain the concepts, significance and functions of food packaging and types of packaging materials

Course Title: Evolution and Ethology - IV semester

Course Outcomes (CO)

1. Describe the history and development of evolutionary thought.
2. Explain the evidence for evolution and its required corollaries. Appreciate evolutionary time scale and origin of unicellular to humans.
3. Describe the molecular mechanisms by which evolution occurs.
4. Explain the processes of evolution by mutation, migration, genetic drift, non-random mating, and natural selection.
5. Appreciate the evolutionary importance of learning, memory and cognition and animal behavior.
6. Explain the methods to study behaviour and appreciate altruism and kin selection in insects and animals.
7. Describe the concept of various behaviors – territoriality, mating, parental care, aggression, foraging, migration and navigation. Understand it's with adaptive significance and fitness.

Course Title: Economic Biology - IV semester

Course Outcomes (CO)

1. Describe the methods of organic substrate decomposition and its application.
2. Explain the application and significances of microbes in agriculture.
3. Explain the methods used for the conversion of biomass to biofuel production.
4. Illustrate the commercial production of economically important Insects, sea food, poultry, and dairy.
5. Explain the methods of mushroom cultivation.