

	Program	M.Sc. Life Science		
	PO Code	Programme Outcomes		
	PO1	The program provides in-depth knowledge about concepts, principles and processes in basic branches of Biology.		
	PO2	It provides an integrated approach to applied areas of Biological Science.		
	PO3	Students acquire knowledge in emerging areas in health care - symptoms, diagnosis and treatment.		
	PO4	Enables the student to appreciate Biodiversity, conservation and importance of environmental sustenance.		
	PO5	Helps the student to understand the working principle of laboratory instruments and emerging techniques and their applications.		
	PO6	Students acquire the required skills in handling scientific instruments, planning and performing laboratory experiments and draw logical inferences.		
	PO7	Develops communication skills, scientific writing and data analysis which will help in expressing ideas with clarity.		
	PO8	Develops a scientific temperament in the students and stresses the importance of ethical practices.		
	PO9	Imbibe professional ethics and moral values in the work - place and social life.		
	PO10	Enables the students to integrate the curriculum to life requirements and empower them to be efficient teachers and researchers.		
Semester	Course Code	Course Name	CO Code	Course Outcomes
			CO1	Describing the body diversity, special features and adaptive characters of invertebrates.

I	CC01	Animal and Plant Diversity	CO2	Discuss the roles and relationships between animals and their environment.
			CO3	Demonstrate knowledge of adaptive characteristics and interesting features of major vertebrate animal groups.
			CO4	Understand the basis of Bentham and Hooker's system of classification. Learn the rules of the International Code of Botanical Nomenclature.
			CO5	Gain knowledge of the characteristic features of a few dicotyledonous families of plants.
			CO6	Learn the interesting features of some plants belonging to Monocot families.
I	CC 02	Biomolecules	CO1	Learn the structures, functions and metabolism of carbohydrates.
			CO2	Elucidation of protein structure and its interactions, its isolation and purification.
			CO3	Understand the protein and amino acid metabolism.
			CO4	Demonstrate knowledge of lipids and its functional role and metabolism.
			CO5	Appreciate the synthesis and metabolism of nucleotide.
I	CC 03	Cell Biology	CO1	Get an in-depth knowledge of the cell as a basic unit of life. Learn the ultra-structure and functions of various cell organelles.
			CO2	Understand the various transport mechanisms of the cell.
			CO3	Learn various aspects of cell signaling. Appreciate the importance of communication between cells and various cell receptors. Gain knowledge about secondary messengers and cell signaling pathways.

			CO4	Understand the process of mitosis and meiosis. Learn the importance of chromosomes in the process of cell division.
			CO5	Study the role of cyclins and protein kinases in regulating the cell cycle as well as the importance of cell cycle check points.
			CO6	Understand the mechanism and importance of programmed cell death.
			CO7	Gain an introduction to plant and animal histology through the study of various tissues.
I	CC 04	Genetics	CO1	Understand the various types of gene interactions and their effects on the phenotype.
			CO2	Study the concepts involved in multiple allelism, sex-linked inheritance and pleiotropism.
			CO3	Understand the concept of non-disjunction of chromosomes and its effects on the phenotype.
			CO4	Gain knowledge about the various mechanisms of extra-nuclear inheritance.
			CO5	Learn the mechanisms involved in the determination of sex in man and other organisms
			CO6	Comprehend various aspects of human genetics and their relevance in medicine.
			CO7	Study the importance of genetics in plant breeding and its impact on agriculture.
			CO8	Understand the concepts of linkage and crossing over and their significance.
I	AC 01	Instrumentation and Lab techniques	CO1	Explain the principle, construction and application of different types of microscopes used to study the morphology of microbes.
			CO2	Describe the working principle of different types of centrifuge and rotor designs.

			CO3	Explain techniques used for characterization of bio molecules.
			CO4	Discuss the application of electrophysiological methods used in diagnosis.
II	CC 05	Basic Microbiology	CO1	Describe the classification, structure and function of microorganisms.
			CO2	Explain the various metabolic pathways in microorganisms.
			CO3	Explain the methods used for microbial culturing and preservation techniques
			CO4	Describe the pathogenicity of pathogenic organism.
			CO5	Explain the structure, classification and methods of cultivating viruses.
II	CC 06	Human Physiology	CO1	Discuss in depth 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.
			CO2	Discuss the role of skin and bone.
			CO3	Describe briefly the basic components and functions of the digestive, excretory, muscular systems and sense organs
			CO4	Recognize the major organs and vessels of the cardiovascular system and understand their
			CO5	Demonstrate competency in identifying the major structures and functions of the central and peripheral nervous system
			CO6	Discuss the various disease conditions associated functions, with the various organ system.
II	CC 07	Plant Physiology	CO1	Gain knowledge regarding various physiological processes taking place in

				plants.
			CO2	Understand concepts related to water and mineral absorption in plants.
			CO3	Comprehend the metabolic pathways involved in physiological processes like photosynthesis, respiration and nitrogen fixation.
			CO4	Learn about the role of plant hormones and their role in promoting growth.
			CO5	Discuss the types of stresses that plants are subjected to and the mechanisms they use to overcome them.
			CO6	Understand the various chemical defenses (alkaloids, glycosides, terpenes and phenolics) used by plants.
II	CC 08	Immunology	CO1	Understand the components of immune system and elucidate the biochemical basis of immunological responses and genetic basis of diversity.
			CO2	Discuss the mechanisms of protection against various diseases and principles governing vaccination
			CO3	Demonstrate the basic knowledge of allergic responses; types of allergies
			CO4	Discuss the antigen and antibody interactions
			CO5	Demonstrate an understanding on the disorders and deficiencies associated with immune system functioning and immunotherapy
II	AC 03	Research Methodology	CO1	Enable students to identify the overall process of designing a research study from its inception to its report.
			CO2	Students can select and define appropriate research problem, organize and conduct research in a structured manner.
			CO3	Also enables students to prepare a project proposal, to

				write a research report, articles and thesis in a decipherable manner.
II	AC 04	Environmental Science	CO1	Understand the various sources, control measures and hazards related to air, land and water pollution.
			CO2	Describe the working principle, construction and application of various dust collectors.
			CO3	Explain the methods used for waste water treatment
			CO4	Discuss the process of municipal solid waste management.
			CO5	Understand the effect of environmental toxicology.
			CO6	Explain the role of microbes in biodegradation and bioleaching.
III	EC 01	Molecular Biology	CO1	Understand various concepts related to molecular biology including DNA and RNA structure, DNA replication, transcription and translation.
			CO2	Learn the structure and functions of nucleic acids.
			CO3	Understand the mechanism of DNA replication and recombination.
			CO4	Gain knowledge regarding types of mutations, mutagens and DNA repair mechanisms.
			CO5	Study the mechanism involved in transcription including mRNA synthesis and processing
			CO6	Study the mechanism 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.
			CO7	Discuss the mechanisms that regulate gene expression both in prokaryotes and eukaryotes.
III	EC 02	Applied Microbiology	CO1	Introduce the components of industrial media and design of fermentors.

			CO2	Understand the methods of screening industrially important organisms and production of fermentation products
			CO3	Demonstrate the microbiology of dairy products and understand their therapeutic value
			CO4	Elucidate the factors influencing the growth of microbes in food , study food borne diseases and understand the various microbial examination and food preservation techniques
			CO5	Demonstrate the knowledge on air microbiology, various air sampling techniques and understand biohazards in occupational environments.
			CO6	Understand rhizospheric and phyllospheric microbes; their beneficial role on plants; their use as biofertilizers and biopesticides and role of soil microbes in leaching of metals
III	EC03	Human Endocrinology and Reproductive Biology	CO1	Demonstrate an understanding of the endocrine organ system. The role of the hormones in maintaining body function. The student will demonstrate knowledge of the major endocrine disorders
			CO2	Demonstrate an understanding of the basic properties of hormones. Describe major actions of each hormone on target cells
			CO3	Students will have broad understanding of reproductive system
			CO4	Students will gain a good basic knowledge of the biological events of early human developmental biology
			CO5	Students will have basic knowledge of reproductive anomalies and assisted reproductive technology
III	EC 03	Plant Developmental Biology and Plant	CO1	Understand the process of microsporogenesis in plants

		Diseases		along with the study of various aspects of pollen grains.
			CO2	Study the process of megasporogenesis and organization of the female gametophyte.
			CO3	Appreciate the concept of double fertilization that is unique to angiosperms.
			CO4	Study the process of embryogenesis in plants and understand the role of the endosperm.
			CO5	Learn about some bacterial and fungal diseases of plants.
III	EC 04	Animal Tissue Culture	CO1	Knowledge on laboratory layout, basics of media preparation, sterilization and factors influencing cell culture.
			CO2	Learn cell culture techniques their maintenance and preservation.
			CO3	Apply cell and molecular techniques to in vitro conditions.
			CO4	Understand the applications of cell culture.
			CO5	Understand the bio - safety procedures and bioethics needed for tissue culture
III	EC 04	Plant Tissue Culture	CO1	Learn the basic laboratory organization, culture media, various culturing methods and germplasm conservation.
			CO2	Understand the various transformation techniques.
			CO3	Application of DNA technology, plant cell as biofactories for the production of Secondary metabolites.
			CO4	Understand the antisense technology and its applications.
			CO5	Learn the concepts of bioethics, GMP and GLP.
III	AC 05	Bioinformatics	CO1	Students get information about recent advances in genomics, proteomics and structural biology and acquisition & application of biological data available from Internet-

				accessible databases and tools.
IV	EC 05	r-DNA Technology	CO1	Appreciate the scope and importance of recombinant DNA technology
			CO2	Comprehend the methods used to analyze nucleic acids and proteins.
			CO3	Understand the various vectors, hosts and tools used in molecular cloning.
			CO4	Learn about the methods in labeling nucleic acids and proteins.
			CO5	Describe the methods used to construct and screen DNA libraries
			CO6	Understand the principle and procedure involved in various techniques used in recombinant DNA technology
IV	EC 06	Clinical Biochemistry and Diagnostics	CO1	Understand enzyme chemistry and its classification
			CO2	Elucidate enzymes as a diagnostic tool
			CO3	Understand the carbohydrate, lipid and protein metabolism and the associated abnormalities
			CO4	Demonstrate the biological roles of metal ions
			CO5	Describe the different organ function tests
			CO6	Understand the clinical applications of radioisotopes
IV	EC 06	Food and Fermentation Technology	CO1	Demonstrate the need for Food Safety and understand the concepts of food adulteration and guidelines to used food additives
			CO2	Introduce the significance of functional foods
			CO3	Understand the various concepts of fermentation
			CO4	Demonstrate the role of microbial and biochemical factors in spoilage of foods
			CO5	Understand the beneficial roles of microbes in fermentations
			CO6	Introduce the concepts, significance and functions of

				food packaging and types of packaging materials
IV	EC 07	Evolution and Ethology	CO1	Students will be able to describe the history and development of evolutionary thought.
			CO2	Students will be able to list and describe the evidence for evolution and its required corollaries. Appreciate evolutionary time scale and origin of unicellular to humans.
			CO3	Describe the molecular mechanisms by which evolution occurs. Provide detailed explanations of the processes of evolution by mutation, migration, genetic drift, non-random mating, and natural selection.
			CO4	Understand the evolutionary importance of animal behavior.
			CO5	Discuss the concept of various behaviors – territoriality, mating, parental care, aggression, foraging, migration and navigation. Understand it's with adaptive significance and fitness
IV	EC 07	Economic Biology	CO1	Describe the methods of organic substrate decomposition and its application.
			CO2	Explain the application and significances of microbes in agriculture.
			CO3	Explain the methods used for the conversion of biomass to biofuel production.
			CO4	Illustrate the commercial production of economically important Insects, sea food, poultry, and dairy.
			CO5	Explain the methods of mushroom cultivation.