

B.Sc. (P) Applied Life Science

PAPER	COURSE LEARNING OUTCOMES
BOTANY	
Biology of Life Forms: Plants	Combination of Theoretical and Practical components will provide <ul style="list-style-type: none">• Comprehensive information and insight into the fascinating world of Microbes and Plants.• Hands on Training will help students learn use of microscope, mounting, section-cutting and staining techniques for the study of plant materials.• Making Drawings in Practical Records will enhance understanding morphological and structural details and related functional aspects in diverse plant groups.• Scope in the field of Medicine, Industry, Agriculture, Research and higher Studies.
Agricultural Botany and Weed Science	After completion of this course the student gain the knowledge on <ul style="list-style-type: none">• Requirement of the conditions for seed germination, plant growth and development• Role of growth hormones in plant development and flowering• Weed control methods
Fundamentals of Plant Systematics and Ecology	
Medicinal Plants and IPR	Upon successfully completing the course the student shall develop <ul style="list-style-type: none">• Knowledge Skills An appreciation of the contribution of medicinal plants to traditional and modern medicine and importance of holistic mode of treatment of the Indian traditional systems of medicine. To develop an understanding of the constraints in promotion and marketing of medicinal plants.• Professional and Practical Skills Transforming the knowledge into skills for promotion of traditional medicine. Developing entrepreneurship skills to establish value addition products, botanical extracts and isolation of bioactive compounds. Students would have deep understanding of patents copyrights, their importance. They can think about the importance of traditional knowledge, bio-prospecting, biopiracy. They would gain the knowledge of farmers rights and the importance on indigenous plant varieties, concept of novelty and biotechnological inventions
Developmental Biology: Plants	The course will acquaint the students <ul style="list-style-type: none">• With internal basic structure and cellular composition of the plant body• To correlate structure with important functions of different plant parts• Study of various tissue systems and their development and functions in plant

	<ul style="list-style-type: none"> To have knowledge of the flowering and fruiting, reproduction process, role of pollinators, ovule and seed development.
Plants Quarantine	<p>Students would have deep understanding of</p> <ul style="list-style-type: none"> Plant Quarantine Order and Amendments, and Issuance of the export and Import Permit, Procedures of Plant quarantine inspection for clearance The need of quarantine of Germplasm, Transgenic or Genetically Modified Organisms, live Insects and microbial cultures, plants and plant products. The laws associated with various acts of plant quarantine
Genetics and Plant Biotechnology	<ul style="list-style-type: none"> Generate interest among the students in Genetics and make them aware about the importance and opportunities in higher education and research, The first unit should be Introductory dealing with how this area has revolutionized all aspects of our life from its growth from Mendel to Genetic Engineering. The first unit may include brief introduction of: Definition, Application of this field in Food production, Medicines, Industries, Bioinformatics, Genomics, Proteomics, Transcriptomics, System Biology to Personalized medicines The successful students will be able to learn the basic concepts, principles and processes in plant biotechnology. They will have the ability of explanation of concepts, principles and usage of the acquired knowledge in biotechnological, pharmaceutical, medical, ecological and agricultural applications. Use basic biotechnological techniques to explore molecular biology of plants Explain how biotechnology is used to for plant improvement and discuss the biosafety concern and ethical issue of that use.
Plant Health Diagnostics and Management	<p>On completion of his course the students will develop an</p> <ul style="list-style-type: none"> Understanding of the various fungal bacterial and virus disease of the plants Understanding and identification of symptoms of plant disease Ability to develop the strategy to prevent and control of plant diseases
Dissertation	<p>Students would gain the skill of understanding the conclusion of scientific data. The will be able to analyze the data and have a gain good writing , presentation and communication skills</p>
Plants Regulators and Economic Botany	<p>On completion of his course the students will develop an</p> <ul style="list-style-type: none"> Understanding of the role of growth regulators in plant growth and development. The will be apply this knowledge for desired seed germination, plant growth, initiation of flowering and fruiting. Understanding of morphology, and processing and economic value of plant sources of cereals, legumes, spices, oil, rubber, timber and medicines. Student would have an ability to estimate the value of plants and can apply this knowledge for sustainable use of plant resources, conservation and management.

CHEMISTRY

Inorganic Chemistry	<p>After completion of the course students will be able to:</p> <ul style="list-style-type: none"> • Understand the quantum mechanical model, metallurgy, hydrometallurgy, the method of extraction of some important metals and the purification of metals using electrolytic and oxidative refining, van Arkel-de Boer process and Mond's process. • Understand the periodicity in atomic and ionic radii, electro negativity, ionization energy, electron affinity of elements of s- and p-block elements. • Understand the important properties of transition metals (3d series) like variable oxidation states, color, magnetic and catalytic properties. • Understand the important properties of Lanthanoids and Actinoids such as electronic configuration, oxidation states, magnetic and spectral properties.
Organic Chemistry -1	<ul style="list-style-type: none"> • On the completion of the course the students will become well verse with the basic concepts of organic chemistry and stereochemistry. • With the introduction of some functional groups like hydrocarbons, alkyl and aryl halides, the students will be able to understand types of organic reactions and the related concepts. • They can think and plan the conversion of one reactant into the other.
Physical chemistry	<p>Student will be able to apply class room knowledge with local environmental phenomenon and interpret them in relation to chemistry involved in same both conceptual and experimental as well.</p>
Conventional Insecticides	<p>Upon successfully completing the course, Students will</p> <ul style="list-style-type: none"> • Learn about the various types of synthetic pesticides available in the market and their selective mode of action on insect population. • Can promote the future use of insecticides as metabolic inhibitors in insect physiological research. And as a result both the pesticides and the plant sciences get the boost.
Organic Chemistry-2	<p>On the completion of the course, the students can comfortably perform the following tasks:</p> <ol style="list-style-type: none"> i. Conceptualize the facts related to the functional groups, ii. Recognize many types organic reactions, iii. Think and plan the conversion of one reactant in to the other and iv. become aware of synchronization of chemistry and biology and hence learn the importance of chemistry in a biological world too.
Analytical Techniquesinvolved in Pesticide Analysis	<p>On the completion of the course, the students</p> <ul style="list-style-type: none"> • Students will able to learn about the various types of analytical techniques involved in pesticide analysis. • They are able to understand separation of mixtures of pesticides by using simple analytical techniques.

Fungicide	<p>On the completion of the course, the students</p> <ul style="list-style-type: none"> • Students will be able to understand about the various types of fungicides and their selective mode of action on fungal cells. • They may be able to identify the plants diseases as well they become more knowledgeable to recommend a treatment strategy for agricultural fields.
Biological Insecticides	<p>The biological insecticides are obtained from natural materials and used to kill or control insect's population. These pesticides are eco-friendly in nature and are also found to be more compatible with the environmental components than the synthetic pesticides</p>
Herbicides	<p>Students will be able to learn about the various types of herbicides and their selective mode of action on unwanted plants. Students can hence promote the future use of herbicides as metabolic inhibitors in plant physiological research; as a result both the pesticide and the plant sciences get the advantages.</p>
Pesticide Formulations	<p>Students will be able to learn about the various types of pesticide formulation for commercial use as well as for domestic use. They are also able to demonstrate the comprehension of chemical product use via label and MSDS sheet published.</p>
ZOOLOGY	
Animal: Form, Structure and Function	<p>Core course-I Animal Form, Structure and Function</p> <ul style="list-style-type: none"> • Understand systematics, taxonomy and structural organization of Kingdom Animalia. • Understand various characteristic features of different classes and orders under both Non-chordates and Chordates. • Understand and correlate with morphological and anatomical aspects in various classes under Kingdom Animalia. • Understand the functioning of various physiological systems within the human body and correlate with the interaction of various organ systems, which eventually results in the overall normal functioning of the body. • Enhance collaborative learning with better analytical ability and communication skills through practical sessions, teamwork, group discussions, assignments, and projects.
Cell and Cellular Processes	<p>Define the cell, and understands the cellular-level organization of diverse tissue of the body.</p> <ul style="list-style-type: none"> • Gain knowledge and skill in identifying various cell structures and their vital components. • A preliminary knowledge of various techniques involved in fixation, staining and procedures used to visualize the cell and its components. • Learn classical laboratory techniques like handling microscopic materials and use of simple and compound microscopes. • Be knowledgeable in proper procedures and regulations in handling and disposal of biological and chemical waste

<p>Biochemistry and Immunology</p>	<p>Understand the concepts of biochemistry and how biomolecules interact with each other to bring about life processes.</p> <ul style="list-style-type: none"> • Appreciate the role of enzymes in metabolic pathways. • Learn how enzyme activity is controlled, its mechanism of action and how a drug might inhibit the enzyme. • Develop practical learning skills like qualitative estimation of carbohydrates, chromatography and interpretation of results. • Understand different components of the Immune system, different defense mechanisms and how they work and provide immunity. • Learn about the structures and functions of different classes of Antibodies. • Develop the knowledge about Monoclonal antibodies and their applications. • Learn how the highly regulated Immune system behaves when the balance is disturbed. • To appreciate the immune system and its various components to protect the host from pathogen with a special emphasis on AIDS, Vaccines and transplantation.
<p>Insect Toxicology</p>	<p>Upon completion of the course, students will be able to:</p> <ul style="list-style-type: none"> • Demonstrate fundamental knowledge and understanding of the principles of insecticide toxicity, and its evaluation for insect pest control. • Explain pest resistance to insecticides and its management, and best practices for safe use of toxic insecticides as well as treatments for insecticide poisoning. • Acquire practical skills of pest management in public buildings; like termite proofing, rodent control, etc.
<p>Molecular Biology and Development Biology</p>	<p>Understand the basic structure and types of nucleic acids - DNA and RNA;</p> <ul style="list-style-type: none"> • Learn the salient features of the genetic code, • Compare and contrast DNA replication machinery and mechanisms in prokaryotes and eukaryotes, • Elucidate the molecular machinery and mechanism of information transfer processes –transcription (formation of RNA from DNA) and translation (formation of proteins from RNA) - in prokaryotes and eukaryotes. • Understand the general principles of transcription regulation in prokaryotes by exploring the structure and function of lactose and tryptophan metabolism operons. • Identify components of gene expression regulation in eukaryotes. • Explain the process of gametogenesis – spermatogenesis and oogenesis. • Describe the fertilization process and mechanisms to block polyspermy. • Define fate maps; explain its significance of methods of constructing. • Detail the early development of frog and chick embryo and identify its stages. • Enlist different types of placenta, its structure and significance.

Biotechnological Control of Pests	<ul style="list-style-type: none"> • Learn Recombination techniques, GIT, Bioremediation • Gain knowledge about transgenic plants (Bt cotton) and animals. • Understand SDS –PAGE • Learn the computer programs to predict and forecast pest attack
General Entomology	<p>Identify and classify insects upto orders</p> <ul style="list-style-type: none"> • Understand methods of collection and preservation of insects and their rearing in the laboratory • Describe the morphology of head, thorax and abdomen of an insect • Explain the structure of various body appendages • Describe the anatomy and physiology of various organ systems in insects • Explain the concept of metamorphosis and its hormonal control • Understand the phenomenon of parthenogenetic development in insects
Biological Control of Pest	<p>After completion of the course, students would be able to:</p> <ul style="list-style-type: none"> • Understand the different types of biological control agents. • Know how the parasites and pathogens infect the hosts. • Learn the basic principles of biological control - conservation, augmentation and importations of biocontrol agents • Recognize the quarantine regulations involved in insect pests control
Applied Entomology	<p>After completion of the course, students would Learn about the concept of pest and pest status.</p> <ul style="list-style-type: none"> • Understand the difference between various types of pests and extent of damage caused by them. • Gain knowledge about important pests of crops, fruits, vegetables, stored grains and insects of medical importance. • Analysis of varied types of control measures for management of pest populations and list suitable control measures- specific for every pest.
Use of nuclear technology for agro-pest management	<p>Demonstrate the knowledge of radiation, types of irradiators and radiation dosimetry in relation to safety and security</p> <ul style="list-style-type: none"> • Uses of radiation technology for production of insect host as well as natural enemies • Skill for uses of Sterile Insect Technology (SIT) in pest management