

**KONGUNADU ARTS AND SCIENCE COLLEGE (AUTONOMOUS)**  
**Re-accredited by NAAC with 'A+' Grade (4th Cycle)**  
**College of Excellence (UGC) Coimbatore - 641 029**

**DEPARTMENT OF BOTANY**

**COURSE OUTCOMES (CO)**

**M.SC. BOTANY**

**For the students admitted  
in the Academic Year 2022-2023**

**22PBO101**

<b>Programme Code: 05</b>		<b>M.Sc., BOTANY</b>		
<b>Core Paper 1: PLANT DIVERSITY - I</b>				
<b>Batch</b> <b>2022-2023</b>	<b>Semester</b> <b>I</b>	<b>Hours / Week</b> <b>7</b>	<b>Total Hours</b> <b>105</b>	<b>Credits</b> <b>5</b>

**COURSE OBJECTIVES**

- To obtain knowledge on diverse groups of Thallophytes.
- To impart insight knowledge on the diversity, structural organization and reproduction of algae, fungi and lichens.
- To acquire knowledge on the life cycle patterns of Thallophytes and their significance.

**COURSE OUTCOMES**

On successful completion of the course, the students will be able to

↑ ↓	K1	CO1	Grasp the basic concepts of lower life forms.
		CO2	Understand the diversity in habits, habitats and organization of various groups of lower plants.
		CO3	Explore knowledge on the modes of nutrition and fructifications in fungi
		CO4	Apply the inherit knowledge on the exploitation of useful products from lower forms for the betterment of human welfare.
	K5	CO5	Evaluate the structural organization and life cycle patterns of various lichens.

**22PBO102**

<b>Programme Code: 05</b>		<b>M.Sc., BOTANY</b>		
<b>Core Paper 2: PLANT DIVERSITY – II</b>				
<b>Batch</b> <b>2022-2023</b>	<b>Semester</b> <b>I</b>	<b>Hours / Week</b> <b>7</b>	<b>Total Hours</b> <b>105</b>	<b>Credits</b> <b>5</b>

**COURSE OBJECTIVES**

- To impart insight knowledge on the structural organizations and life cycle patterns of Bryophytes, Pteridophytes and Gymnosperms.
- To understand the basic concepts of evolutionary trends in Cryptogams and Phanerogams.
- To learn the preserved vestiges of various plant life forms of geological past.

**COURSE OUTCOMES**

On successful completion of the course, the students will be able to

↑ ↓	K1	CO1	Gain knowledge on ecological and phylogenetical aspects of Bryophytes.
		CO2	Understand the general distribution and characters of Pteridophytes.
		CO3	Apply knowledge on vascular organization and evolution of Pteridophytes.
		CO4	Distinguish various diagnostic features and distribution of Gymnosperms.
	K5	CO5	Analyze the acquired knowledge on diversity of plant species and apply to the field level.

22PBO103

<b>Programme Code: 05</b>		<b>M.Sc., BOTANY</b>		
<b>Core Paper: 3 –ANATOMY, EMBRYOLOGY OF ANGIOSPERMS AND MICROTECHNIQUES</b>				
<b>Batch</b> 2022-2023	<b>Semester</b> I	<b>Hours / Week</b> 7	<b>Total Hours</b> 105	<b>Credits</b> 5

### COURSE OBJECTIVES

- To acquire knowledge about complex vascular tissues.
- To obtain inherent knowledge on micro and mega sporangial development and their functions.
- To understand the histochemical techniques involved in permanent micro slides.

### COURSE OUTCOMES

On successful completion of the course, the students will be able to

K1 ↑ ↓ K5	CO1	Recognize various histochemical techniques involved in anatomy and embryology.
	CO2	Understand phylogenetic relationship of vascular tissues.
	CO3	Explore the embryological features of plants
	CO4	Analyze the techniques of parthenocarpy and polyembryony for the improvement of economically important crop species..
	CO5	Determine knowledge on the principles and concepts of histochemical staining techniques

22PBO1CL

<b>Programme Code: 05</b>		<b>M.Sc., BOTANY</b>		
<b>Core Practical 1: PLANT DIVERSITY- I &amp; II, ANATOMY, EMBRYOLOGY OF ANGIOSPERMS AND MICROTECHNIQUES</b>				
<b>Batch</b> 2022-2023	<b>Semester</b> I	<b>Hours / Week</b> 4	<b>Total Hours</b> 60	<b>Credits</b> 2

### COURSE OBJECTIVES

- To understand the diversity and distribution of lower life forms.
- To obtain insight knowledge on variations in the internal structural organization among plants.
- To impart inherent knowledge on the basic techniques and modern concepts of microtome.

### COURSE OUTCOMES

On successful completion of the course, the students will be able to

K3 ↑ ↓ K5	CO1	Acquire and analyze inter-relationships between various lower life forms
	CO2	Examine variations in structural organization and reproduction of Cryptogams and Phanerogams
	CO3	Understand the primary and secondary structure of plants.
	CO4	Analyze data on the types of fossils and distribution pattern of lower life forms in various eras
	CO5	Monitor the sequential changes in the internal structural organization of plants by sectioning through Microtechniques

<b>Programme Code: 05</b>		<b>M.Sc., BOTANY</b>		
<b>Core Paper 4: BIOINFORMATICS</b>				
<b>Batch</b> 2022-2023	<b>Semester</b> II	<b>Hours / Week</b> 7	<b>Total Hours</b> 105	<b>Credits</b> 4

### COURSE OBJECTIVES

- To understand the concepts of bioinformatics and its application in various fields of plant science
- To understand the structure of biological databases and their utilities.
- To impart knowledge on various tools of biological databases.

### COURSE OUTCOME

On successful completion of the course, the students will be able to

K1 ↑ ↓ K5	CO1	Grasp knowledge on various biological databases.
	CO2	Impart knowledge on gene and its expression both in prokaryotes and eukaryotes.
	CO3	Obtain knowledge on the sequences of amino acids in protein molecules.
	CO4	Acquire knowledge on appropriate algorithms and to identify the similarities and dissimilarities existing between the genes of various organisms.
	CO5	Evaluate evolutionary relationships between organisms and biomolecular visualization tools.

22PBO205

<b>Programme Code: 05</b>		<b>M.Sc., BOTANY</b>		
<b>Core Paper 5: CELL BIOLOGY, GENETICS, PLANT BREEDING AND BIOSTATISTICS</b>				
<b>Batch</b> 2022-2023	<b>Semester</b> II	<b>Hours / Week</b> 7	<b>Total Hours</b> 105	<b>Credits</b> 5

### COURSE OBJECTIVES

- To learn the concept of genes and gene interactions.
- To study about the principles of Mendelian's and non-Mendelian's inheritance
- To assess the methods of plant breeding and crop improvement
- To learn the experimental designs using biostatistical tools

### COURSE OUTCOMES

On successful completion of the course, the students will be able to

K1 ↑ ↓ K5	CO1	Acquire knowledge on various fields of genetics
	CO2	Identify the sex linked disease among the population
	CO3	Implement knowledge on the concepts of mutation for the development of new plant varieties
	CO4	Describe various molecular breeding techniques for genetic improvement of crops
	CO5	Evaluate appropriate biostatistical tools for designing any biological experiments

<b>Programme Code: 05</b>		<b>M.Sc., BOTANY</b>		
<b>Core Paper 6: ECOLOGY, BIOENERGETICS AND NATURAL RESOURCE MANAGEMENT</b>				
<b>Batch 2022-2023</b>	<b>Semester II</b>	<b>Hours / Week 7</b>	<b>Total Hours 105</b>	<b>Credits 5</b>

### COURSE OBJECTIVES

- To understand the structural and functional organization of the ecosystems.
- To know the causes of environmental deterioration and possible measures for their rejuvenation.
- To understand the natural calamities and disaster management.

### COURSE OUTCOMES

On successful completion of the course, the students will be able to

K1 ↑ ↓ K5	CO1	Gain knowledge on community concepts and their ecological niches
	CO2	Understand the principles and process of biogeochemical cycling between organisms and the environment
	CO3	Apply concepts of energy flow and dispersion in various ecosystems
	CO4	Monitor environmental hazards and their control measures
	CO5	Evaluate the changes in biodiversity and their management approaches through remote sensing techniques

22PBO2CM

<b>Programme Code: 05</b>		<b>M.Sc., BOTANY</b>		
<b>Core Practical 2: BIOINFORMATICS, CELL BIOLOGY, GENETICS, PLANT BREEDING, BIostatISTICS, ECOLOGY, BIOENERGETICS AND NATURAL RESOURCE MANAGEMENT</b>				
<b>Batch 2022-2023</b>	<b>Semester II</b>	<b>Hours / Week 4</b>	<b>Total Hours 60</b>	<b>Credits 2</b>

### COURSE OBJECTIVES

- To acquire and realize evolutionary relationships existing between the organisms
- To understand genetic analysis at gene, genome and population level
- To learn the experimental designs using biostatistical tools.
- To find out the dominant species in the particular environment.

### COURSE OUTCOMES

On successful completion of the course, the students will be able to

K3 ↑ ↓ K5	CO1	Evaluate various techniques, algorithms and tools used for phylogenetic analysis
	CO2	Examine different stages of mitosis and meiosis cell division in plant cell
	CO3	Design experimental methods using statistical knowledge.
	CO4	Analyze the physico-chemical nature of the soil.
	CO5	Determine the distribution of vegetation using quantitative ecological characters.

<b>Programme Code: 05</b>		<b>M.Sc., BOTANY</b>		
<b>Core Paper 7: TAXONOMY AND BIOSYSTEMATICS</b>				
<b>Batch 2022-2023</b>	<b>Semester III</b>	<b>Hours / Week 7</b>	<b>Total Hours 105</b>	<b>Credits 5</b>

### COURSE OBJECTIVES

- To study about the classification and nomenclature of Angiosperms.
- To understand the theory and practices involved in plant systematics.
- To learn the striking affinities of different plant families.

### COURSE OUTCOMES

On successful completion of the course, the students will be able to

K1 ↑ ↓ K5	CO1	Acquire knowledge on principles and objectives of ICN and APG
	CO2	Differentiate various systems of classifications based on natural and phylogenetic characters of flowering plants
	CO3	Explore proficiency skills using keys for identification of any unknown plant species
	CO4	Able to apply basics of biosystematics in various fields of plant sciences
	CO5	Evaluate modern advances of taxonomical tools for plant identification

<b>Programme Code: 05</b>		<b>M.Sc., BOTANY</b>		
<b>Core Paper 8: MICROBIOLOGY AND PLANT PATHOLOGY</b>				
<b>Batch 2022-2023</b>	<b>Semester III</b>	<b>Hours / Week 7</b>	<b>Total Hours 105</b>	<b>Credits 4</b>

### COURSE OBJECTIVES

- To disseminate knowledge on pathogenic group of organisms.
- To gain knowledge on disease management.
- To analyze the quality of water.

### COURSE OUTCOMES

On successful completion of the course, the students will be able to

K1 ↑ ↓ K5	CO1	Recognize evolutionary relationships of microorganisms through various classifications.
	CO2	Understand the techniques of isolation and culture of microorganisms.
	CO3	Apply recent technologies and methods for the cultivation of microorganisms.
	CO4	Acquire knowledge on various plant diseases and their control measures
	CO5	Implement the plant disease management techniques in the fields.

22PBO309

<b>Programme Code: 05</b>		<b>M.Sc., BOTANY</b>		
<b>Core Paper 9: PLANT BIOTECHNOLOGY</b>				
<b>Batch 2022-2023</b>	<b>Semester III</b>	<b>Hours / Week 6</b>	<b>Total Hours 90</b>	<b>Credits 4</b>

### COURSE OBJECTIVES

- To study the basic of plant genome and tissue culture techniques
- To equip students with theoretical knowledge regarding the techniques and applications of Plant Biotechnology and Genetic Engineering
- To help students to get a career in Industry/R&D/Academic

### COURSE OUTCOMES

On successful completion of the course, the students will be able to

K1 ↑ ↓ K5	CO1	Describe the genome organizations in plants
	CO2	Work on plant cell and tissue culture systems
	CO3	Explain the genetic transformation techniques in plants
	CO4	Utilize the applications of genetic transformation techniques in plants
	CO5	Analyze and evaluate the importance of metabolic engineering and molecular farming technology in plants

22PBO3CN

<b>Programme Code: 05</b>		<b>M.Sc., BOTANY</b>		
<b>Core Practical 3: TAXONOMY, BIOSYSTEMATICS, MICROBIOLOGY, PLANT PATHOLOGY AND PLANT BIOTECHNOLOGY</b>				
<b>Batch 2022-2023</b>	<b>Semester III</b>	<b>Hours / Week 4</b>	<b>Total Hours 60</b>	<b>Credits 2</b>

### COURSE OBJECTIVES

- To identify selected taxa using taxonomic keys.
- To understand the pathogenic organisms causing various diseases.
- To learn the basic techniques of plant biotechnology

### COURSE OUTCOMES

On successful completion of the course, the students will be able to

K3 ↑ ↓ K5	CO1	Acquire knowledge on identification of flowering plants using taxonomic keys and learn about the methods and preparation of herbarium
	CO2	Analyze techniques used for cultivation of microorganisms
	CO3	Explore knowledge on disease causing microorganisms and their control measures
	CO4	Gain the hands-on exposure on plant cell and tissue culture and molecular techniques
	CO5	Work on various aspects of plant biotechnology

22PBO410

<b>Programme Code: 05</b>		<b>M.Sc., BOTANY</b>		
<b>Core Paper: 10 – BIOPHYSICS AND BIOCHEMISTRY</b>				
<b>Batch 2021-2022</b>	<b>Semester IV</b>	<b>Hours / Week 7</b>	<b>Total Hours 105</b>	<b>Credits 4</b>

### COURSE OBJECTIVES

- To understand the role of electrons in absorption of light and to impart knowledge on bioenergetics of living organisms
- To know the biological importance of the macromolecules
- To learn about the hormones and vitamins and their roles

### COURSE OUTCOMES

On successful completion of the course, the students will be able to

K1 ↑ ↓ K5	CO1	Acquire knowledge on electromagnetic spectrum.
	CO2	Able to learn on energy production in cell
	CO3	Impart knowledge on types and functions of carbohydrates and lipids
	CO4	Provide knowledge on key macro molecules and carry instructions for the functioning of the cell
	CO5	Understand the importance of enzymes and their mode of action

22PBO411

<b>Programme Code: 05</b>		<b>M.Sc., BOTANY</b>		
<b>Core Paper 11: PLANT PHYSIOLOGY</b>				
<b>Batch 2022-2023</b>	<b>Semester IV</b>	<b>Hours / Week 7</b>	<b>Total Hours 105</b>	<b>Credits 5</b>

### COURSE OBJECTIVES

- To study the basic physiological functions of plants.
- To learn about the metabolic pathways in plants.
- To understand the importance of phytohormones in the growth of plants.

### COURSE OUTCOMES

On successful completion of the course, the students will be able to

K1 ↑ ↓ K5	CO1	Acquire knowledge on plant - water relations in a plant cell
	CO2	Understand the significance of metabolic pathways in plants.
	CO3	Acquire knowledge in terms of pathways of photosynthesis, respiration and nitrogen metabolism in higher plants
	CO4	Assess stress resistance mechanism for the better yield of crops.
	CO5	Apply acquired knowledge on phytohormones and their applications in fruit ripening process.



<b>Programme Code: 05</b>		<b>M.Sc., BOTANY</b>		
<b>Core Paper 12: BIOINSTRUMENTATION AND RESEARCH METHODOLOGY</b>				
<b>Batch 2022-2023</b>	<b>Semester IV</b>	<b>Hours / Week 6</b>	<b>Total Hours 90</b>	<b>Credits 4</b>

### COURSE OBJECTIVES

- To seed the basic knowledge about instruments
- To make students understand the applications of instruments in Botany
- To train the students handle and maintain instruments
- To understand basic concepts of research and its methodologies
- To identify appropriate research topics

### COURSE OUTCOMES

On successful completion of the course, the students will be able to

K1 ↑ ↓ K5	CO1	Inculcate the working principles of biological instruments
	CO2	Acquire knowledge on separation and identification of compounds based on chromatographic techniques
	CO3	To know basic principle for the separation of DNA, RNA and protein molecules
	CO4	Demonstrate knowledge of Research Processes and Perform literature reviews using print and online databases
	CO5	Identify, Explain, compare and prepare key elements of a research proposal/report

22PBO4CO

<b>Programme Code: 05</b>		<b>M.Sc., BOTANY</b>		
<b>Core Practical 4 - BIOPHYSICS, BIOCHEMISTRY, PLANT PHYSIOLOGY, BIOINSTRUMENTATION AND RESEARCH METHODOLOGY</b>				
<b>Batch 2022-2023</b>	<b>Semester IV</b>	<b>Hours / Week 4</b>	<b>Total Hours 60</b>	<b>Credits 2</b>

### COURSE OBJECTIVES

- To learn the significance of EMR and spectrum
- To quantify the biochemical contents present in a given plant sample.
- To obtain knowledge on physiological functions of the plants.
- To utilize the applications of instruments for biochemical studies

### COURSE OUTCOMES

On successful completion of the course, the students will be able to

K3 ↑ ↓ K5	CO1	Provide knowledge on the concepts and principles of radioactive emissions
	CO2	Apply principles and procedures for the estimation of macromolecules in plant samples.
	CO3	Study the physiological process of plants
	CO4	Handle instruments for biophysics and biochemical practical's
	CO5	Able to utilize protocols for research process

<b>Programme Code: 05</b>		<b>M.Sc., BOTANY</b>		
<b>PROJECT &amp; VIVA – VOCE</b>				
<b>Batch 2022-2023</b>	<b>Semester IV</b>	<b>Hours / Week 2</b>	<b>Total Hours 30</b>	<b>Credits 5</b>

### COURSE OBJECTIVES

- To acquire inherent knowledge and exposures on relevant practical problems in various fields.
- To execute appropriate analytical skills and skills sets on selected problems.
- To impart insight knowledge on problem solving skills and their proper execution

### COURSE OUTCOME

On successful completion of the project work, the students will be able to

K3 ↑ ↓ K5	CO1	Applying theoretical knowledge in the real field of research
	CO2	Analyzing the importance of tasks in collecting the datas
	CO3	Evaluating relationships existing between theories and experiments
	CO4	Provide problem solving skills on selected problems in any disciplines of plant sciences
	CO5	Executing appropriate statistical tools and interpretation of appropriate results

<b>Programme Code: 05</b>	<b>M.Sc., BOTANY</b>		
	<b>Major Elective 1: FOREST RESOURCES AND CONSERVATION</b>		
<b>Batch 2022-2023</b>	<b>Hours / Week 5</b>	<b>Total Hours 75</b>	<b>Credits 5</b>

### COURSE OBJECTIVES

- To understand the importance and value of trees.
- To learn the revenue sources of forests.
- To grasp various products derived from forests for the betterment of human beings.

### COURSE OUTCOMES

On successful completion of the course, the students will be able to

K1 ↑ ↓ K5	CO1	Recognize the forest cover in India and their deterioration.
	CO2	Understand the significance of forest and climate change for the enhancement of environmental quality.
	CO3	Apply inherit knowledge on major and minor forest produce for the betterment of human welfare.
	CO4	Analyze forest based products and their varied applications.
	CO5	Implement acquired knowledge on conservation of bioresources.

<b>Programme Code: 05</b>	<b>M.Sc., BOTANY</b>		
	<b>Major Elective: 2 - SEED TECHNOLOGY</b>		
<b>Batch 2022-2023</b>	<b>Hours / Week 5</b>	<b>Total Hours 75</b>	<b>Credits 5</b>

### COURSE OBJECTIVES

- To understand the principles of agronomy of seeds.
- To learn the methodology of seed germination, seed drying and seed treatments.
- To know the seed dormancy and their significance

### COURSE OUTCOMES

On successful completion of the course, the students will be able to

K1 ↑ ↓ K5	CO1	Recognize seed borne diseases due to genetic constitution and storage of seeds.
	CO2	To acquaint the students with principles and practices of seed health testing and management of seed borne diseases
	CO3	To impart knowledge on principles and techniques of seed processing for quality upgradation and storage for maintenance of seed quality.
	CO4	Assess various feasible seed treatment and marketing strategies for various crop plants.
	CO5	Evaluate various methods of breaking seed dormancy.

<b>Programme Code: 05</b>	<b>M.Sc., BOTANY</b>		
	<b>Major Elective 3 - FOOD SCIENCE AND NUTRITION</b>		
<b>Batch 2022-2023</b>	<b>Hours / Week 5</b>	<b>Total Hours 75</b>	<b>Credits 5</b>

### COURSE OBJECTIVES

- To learn the importance of different kinds of foods.
- To acquire knowledge on nutritive values of food.
- To create awareness about food adulterations

### COURSE OUTCOMES

On successful completion of the course, the students will be able to

K1 ↑ ↓ K5	CO1	Recognize various nutritive composition of cereals and cereal products.
	CO2	Understand processing practices of various foods based on their nutrients composition.
	CO3	Apply acquired knowledge on food processing technology in vegetables and fruits.
	CO4	Assess nutritive evaluation of spices and sugar based products.
	CO5	Evaluate the technologies employed for the processing of beverages.

<b>Programme Code: 05</b>	<b>M.Sc., BOTANY</b>		
	<b>Major Elective 4: HORTICULTURE</b>		
<b>Batch 2022-2023</b>	<b>Hours / Week 5</b>	<b>Total Hours 75</b>	<b>Credits 5</b>

### COURSE OBJECTIVES

- To learn about the propagation methods of horticultural crops.
- To study about gardening, landscaping and their maintenance.
- To acquire knowledge about commercial floriculture and cut flower arrangements.

### COURSE OUTCOMES

On successful completion of the course, the students will be able to

K1 ↑ ↓ K5	CO1	Gain knowledge on solutions for a wide spectrum of plant health issues.
	CO2	Understand the components and adornments of gardening.
	CO3	Apply inherent knowledge on various plant propagation techniques.
	CO4	Explore knowledge on cultivation practices of fruits and vegetables.
	CO5	Demonstrate the aesthetic value of gardening .

<b>Programme Code: 05</b>	<b>M.Sc., BOTANY</b>		
	<b>Major Elective 5: MOLECULAR BIOLOGY</b>		
<b>Batch 2022-2023</b>	<b>Hours / Week 5</b>	<b>Total Hours 75</b>	<b>Credits 5</b>

### COURSE OBJECTIVES

- To understand the basic knowledge and organization of genome
- To learn the historical development of molecular biology
- To know and acquire fundamental knowledge on molecular mechanism of gene expression and protein synthesis

### COURSE OUTCOMES

On successful completion of the course, the students will be able to

K1 ↑ ↓ K5	CO1	Gain fundamental knowledge on molecular biology
	CO2	Understand and acquire knowledge on nucleic acid and genome organization
	CO3	Gain impact knowledge on molecular mechanism of gene expression and various molecular process at RNA level
	CO4	Apply knowledge on machinery and molecular mechanism of protein synthesis
	CO5	Evaluate the acquired knowledge on molecular biological tools in to the future research

<b>Programme Code: 05</b>	<b>M.Sc., BOTANY</b>		
	<b>Major Elective 6: ALGAL TECHNOLOGY</b>		
<b>Batch 2022-2023</b>	<b>Hours / Week 5</b>	<b>Total Hours 75</b>	<b>Credits 5</b>

### **COURSE OBJECTIVES**

- To study the laboratory culture protocol for algae
- To know the morphological characters and nutrient requirement of algae
- To learn seaweed farming and harvesting methods

### **COURSE OUTCOMES**

On successful completion of the course, the students will be able to

K1 ↑ ↓ K5	CO1	Provide knowledge on commercial importance of algae
	CO2	Prepare and optimize the medium for culturing algae
	CO3	Work on seaweeds and utilize the benefits
	CO4	Learn various culture techniques for mass cultivation of seaweeds
	CO5	Start a small scale unit for marketing of cultivated algae

<b>Programme Code: 05</b>	<b>M.Sc., BOTANY</b>		
	<b>Major Elective 7: BIOFERTILIZERS AND SOLID WASTE MANAGEMENT</b>		
<b>Batch 2022-2023</b>	<b>Hours / Week 5</b>	<b>Total Hours 75</b>	<b>Credits 5</b>

### **COURSE OBJECTIVES**

- To study the basic knowledge on biofertilizers
- To understand the impact of solid waste on environment, human and plant health
- To acquire knowledge about reuse, recycle and recovery of solid waste by biological processing methods

### **COURSE OUTCOMES**

On successful completion of the course, the students will be able to

K1 ↑ ↓ K5	CO1	Apply knowledge on implementations of biofertilizers in agriculture
	CO2	Know about microbial based fertilizers
	CO3	Acquire knowledge on solid waste management.
	CO4	Inculcate the method in maintenance of sanitary landfills
	CO5	Awareness on the various policies of solid waste management

<b>Programme Code: 05</b>	<b>M.Sc., BOTANY</b>		
	<b>Major Elective 8: APPLIED MICROBIOLOGY</b>		
<b>Batch 2022-2023</b>	<b>Hours / Week 5</b>	<b>Total Hours 75</b>	<b>Credits 5</b>

### COURSE OBJECTIVES

- To provide basic knowledge on the various applications of microorganisms
- To introduce the techniques involved in microbiology
- To assess the role of microorganisms in human welfare

### COURSE OUTCOMES

On successful completion of the course, the students will be able to

K1 ↑ ↓ K5	CO1	Acquire knowledge on the fundamental aspects of microbiology.
	CO2	Understand the use of microbes in industries for the welfare of mankind.
	CO3	Apply knowledge on preservation of food and vegetables using suitable techniques and their commercial applications
	CO4	Grasp the knowledge on distribution of microbes in the environment and prevent their harmful effects.
	CO5	Predict the pathogenesis and control of disease causing microbes.

<b>Programme Code: 05</b>	<b>M.Sc., BOTANY</b>		
	<b>Non-Major Elective1: Herbal Medicine</b>		
<b>Batch 2022-2023</b>	<b>Hours / Week 4</b>	<b>Total Hours 60</b>	<b>Credits 4</b>

### COURSE OBJECTIVES

- To impart inherent knowledge on traditional system of herbal medicine
- To understand the history, scope and therapeutic aspects of medicinal plants
- To apply the gained knowledge and advice the community on issues concerning the cultivation, harvesting and processing of medicinal plants and their products.
- To classify crude drugs based on their morphological, taxonomical, chemical or pharmacological characters

### COURSE OUTCOMES

On successful completion of the course, the students will be able to

K1 ↑ ↓ K5	CO1	Recollect indigenous knowledge on Indian systems of traditional medicine
	CO2	Provide therapeutic and pharmaceutical aspects of traditionally used medicinal plants
	CO3	Apply various methods of plant analysis for the exploitation of phytochemical constituents from plant sources
	CO4	Analyze cultivation and marketing strategies of medicinal plants
	CO5	Assess the potential applications of natural plant based drugs in pharmaceutical, nutraceutical and cosmeceutical industries

<b>Programme Code: 05</b>	<b>M.Sc., BOTANY</b>		
	<b>Non-Major Elective 2: Limnology</b>		
<b>Batch</b> <b>2022-2023</b>	<b>Hours / Week</b> <b>4</b>	<b>Total Hours</b> <b>60</b>	<b>Credits</b> <b>4</b>

### COURSE OBJECTIVES

- To study morphological and anatomical characters of aquatic flora.
- To understand the significance of the diffused light for the planktons.
- To find the gross and net productivity in fresh water life forms.

### COURSE OUTCOMES

On successful completion of the course, the students will be able to

K1 ↑ ↓ K5	CO1	Acquire knowledge on structural and functional aspects of freshwater ecosystem
	CO2	Understand the factors responsible for lotic and lentic ecosystems
	CO3	Implement knowledge on methods of conservation of fresh water bodies
	CO4	Apply inherent knowledge on various kinds of planktonic communities and their adaptations
	CO5	Compare various aspects of biomass efficiency and their productivity

<b>Programme Code: 05</b>	<b>M.Sc., BOTANY</b>		
	<b>Non-Major Elective 3: Biotechnology and Nanobiology</b>		
<b>Batch</b> <b>2022-2023</b>	<b>Hours / Week</b> <b>4</b>	<b>Total Hours</b> <b>60</b>	<b>Credits</b> <b>4</b>

### COURSE OBJECTIVES

- To know the principles and applications of plant tissue culture
- To learn and familiarize plant genetic transformation and its applications
- To learn the basic knowledge of Nanobiology

### COURSE OUTCOMES

On successful completion of the course, the students will be able to

K1 ↑ ↓ K5	CO1	Acquire knowledge on various developments and potential applications of biotechnology
	CO2	Understand the basic techniques of gene manipulation and their rapid applications in the field of plant tissue culture and genetic engineering
	CO3	Exploit nanotechnological tools to create new biomedical research tools, diagnostic tests and drug delivery systems
	CO4	Apply the concept of nanotechnology for achieving major task using nanoparticles
	CO5	Evaluate the applications of both biotechnology and nanobiology

<b>Programme Code: 05</b>		<b>M.Sc., BOTANY</b>		
		<b>Non-Major Elective 4: Information Security</b>		
<b>Batch</b> 2022-2023	<b>Semester</b> IV	<b>Hours / Week</b> 4	<b>Total Hours</b> 60	<b>Credits</b> 4

### COURSE OBJECTIVES

- Students will identify the core concepts of Information security.
- To examine the concepts of Information Security.
- To design and implement the security features for IT and Industrial sectors

### COURSE OUTCOMES

On successful completion of the course, the students will be able to

K1 ↑ ↓ K5	CO1	To Learn the principles and fundamentals of information security.
	CO2	To Demonstrate the knowledge of Information security concepts
	CO3	To Understand about Information Security Architecture.
	CO4	To Analyze the various streams of security in IT and Industrial sector.
	CO5	To know about cyber laws and regulations.

### 22PBO3X1

<b>Programme Code: 05</b>		<b>For PG STUDENTS</b>		
<b>Extra Departmental Course (EDC) - APPLIED HORTICULTURE</b>				
<b>Batch</b> 2022-2023	<b>Semester</b> III	<b>Hours / Week</b> 2	<b>Total Hours</b> 30	<b>Credits</b> 2

### COURSE OBJECTIVES

- To learn about the propagation methods of horticultural crops.
- To study about gardening, landscaping and their maintenance.
- To acquire knowledge on commercial floriculture and cut flower arrangements.

### COURSE OUTCOMES

On successful completion of the course, the students will be able to

K1 ↑ ↓ K5	CO1	Demonstrate solutions for a wide spectrum of plant health issues
	CO2	Understand the components and adornments of gardening
	CO3	Develop employability skills in the field of gardening and landscaping
	CO4	Analyze inherent knowledge on various nursery practices and their management systems
	CO5	Evaluate the concepts and principles of floriculture



22PBO0J1

<b>Programme Code: 05</b>	<b>M.Sc., BOTANY</b>	
<b>JOC 1: Floriculture and Landscaping</b>		
<b>Batch</b> 2022-2023	<b>Hours / Week</b> 4	<b>Credits</b> 2

#### **COURSE OBJECTIVES**

- To know the latest development in the field of floriculture.
- To develop skills on arena of floriculture and landscaping.
- To create knowledge on self employment through entrepreneur skills

#### **COURSE OUTCOMES**

On successful completion of the course, the students will be able to

K1 ↑ ↓ K5	CO1	Acquire knowledge on cultivation of economic flowers.
	CO2	Understand the techniques involved in flower arrangement and decoration.
	CO3	Apply knowledge on green house cultivation practices.
	CO4	Implement acquired knowledge on commercial applications of plants in landscape gardening.
	CO5	Demonstrate strategic plans for designing various types of gardens

22PBO0J2

<b>Programme Code: 05</b>	<b>M.Sc., BOTANY</b>	
<b>JOC 2 : Food Processing and Preservation</b>		
<b>Batch</b> 2022-2023	<b>Hours / Week</b> 4	<b>Credits</b> 2

#### **COURSE OBJECTIVES**

- To know the recent technologies developed in the field of food science
- To develop skills in the aspects of Food processing and preservation
- To get employment opportunities in food processing industries

#### **COURSE OUTCOMES**

On successful completion of the course, the students will be able to

K1 ↑ ↓ K5	CO1	Recognize about preliminary preparation of food through various processes
	CO2	Understand the nutritive values and significance of cereals
	CO3	Apply knowledge on pulses and nuts and their nutritive perspectives
	CO4	Implement food preservation techniques applicable for day to day life
	CO5	Evaluate strategies for the preservation of food products and their quality enhancement