

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 2023-2024**

23PBO101

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|--|-----------------------------|---------------------------------|----------------------------------|----------------------------|
| Programme Code: 05 | | M.Sc., BOTANY | | |
| Core Paper 1: PLANT DIVERSITY - I | | | | |
| Batch 2023-2024 | Semester I | Hours / Week 7 | Total Hours 105 | Credits 5 |

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

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| ↑ ↓ | 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. |

23PBO102

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|---|-----------------------------|---------------------------------|----------------------------------|----------------------------|
| Programme Code: 05 | | M.Sc., BOTANY | | |
| Core Paper 2: PLANT DIVERSITY – II | | | | |
| Batch 2023-2024 | Semester I | Hours / Week 7 | Total Hours 105 | Credits 5 |

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

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| ↑ ↓ | 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. |

23PBO103

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|--|----------------------|--------------------------|---------------------------|---------------------|
| Programme Code: 05 | | M.Sc., BOTANY | | |
| Core Paper: 3 –ANATOMY, EMBRYOLOGY OF ANGIOSPERMS AND MICROTECHNIQUES | | | | |
| Batch 2023-2024 | Semester I | Hours / Week 7 | Total Hours 105 | Credits 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

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| 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 |

23PBO1CL

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|--|----------------------|--------------------------|--------------------------|---------------------|
| Programme Code: 05 | | M.Sc., BOTANY | | |
| Core Practical 1: PLANT DIVERSITY- I & II, ANATOMY, EMBRYOLOGY OF ANGIOSPERMS AND MICROTECHNIQUES | | | | |
| Batch 2023-2024 | Semester I | Hours / Week 4 | Total Hours 60 | Credits 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

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| 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 |

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| Programme Code: 05 | | M.Sc., BOTANY | | |
| Core Paper 4: BIOINFORMATICS | | | | |
| Batch 2023-2024 | Semester II | Hours / Week 7 | Total Hours 105 | Credits 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

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| 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. |

23PBO205

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|---|------------------------|---------------------------|----------------------------|----------------------|
| Programme Code: 05 | | M.Sc., BOTANY | | |
| Core Paper 5: CELL BIOLOGY, GENETICS, PLANT BREEDING AND BIOSTATISTICS | | | | |
| Batch 2023-2024 | Semester II | Hours / Week 7 | Total Hours 105 | Credits 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

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| 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 |

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| Programme Code: 05 | | M.Sc., BOTANY | | |
| Core Paper 6: ECOLOGY, BIOENERGETICS AND NATURAL RESOURCE MANAGEMENT | | | | |
| Batch 2023-2024 | Semester II | Hours / Week 7 | Total Hours 105 | Credits 5 |

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

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| 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 |

23PBO2CM

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|--|------------------------|---------------------------|---------------------------|----------------------|
| Programme Code: 05 | | M.Sc., BOTANY | | |
| Core Practical 2: BIOINFORMATICS, CELL BIOLOGY, GENETICS, PLANT BREEDING, BIostatISTICS, ECOLOGY, BIOENERGETICS AND NATURAL RESOURCE MANAGEMENT | | | | |
| Batch 2023-2024 | Semester II | Hours / Week 4 | Total Hours 60 | Credits 2 |

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

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| 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. |

23PBO307

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|--|-------------------------|---------------------------|----------------------------|----------------------|
| Programme Code: 05 | | M.Sc., BOTANY | | |
| Core Paper 7: TAXONOMY AND BIOSYSTEMATICS | | | | |
| Batch 2023-2024 | Semester III | Hours / Week 7 | Total Hours 105 | Credits 5 |

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

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| 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 |

23PBO308

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|---|-------------------------|---------------------------|----------------------------|----------------------|
| Programme Code: 05 | | M.Sc., BOTANY | | |
| Core Paper 8: MICROBIOLOGY AND PLANT PATHOLOGY | | | | |
| Batch 2023-2024 | Semester III | Hours / Week 7 | Total Hours 105 | Credits 4 |

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

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| 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. |

23PBO309

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| Programme Code: 05 | | M.Sc., BOTANY | | |
| Core Paper 9: PLANT BIOTECHNOLOGY | | | | |
| Batch 2023-2024 | Semester III | Hours / Week 6 | Total Hours 90 | Credits 4 |

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

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| 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 |

23PBO3CN

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|--|------------------------|--------------------------|--------------------------|---------------------|
| Programme Code: 05 | | M.Sc., BOTANY | | |
| Core Practical 3: TAXONOMY, BIOSYSTEMATICS, MICROBIOLOGY, PLANT PATHOLOGY AND PLANT BIOTECHNOLOGY | | | | |
| Batch 2023-2024 | Semester III | Hours / Week 4 | Total Hours 60 | Credits 2 |

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

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| 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 |

23PBO410

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| Programme Code: 05 | | M.Sc., BOTANY | | |
| Core Paper: 10 – BIOPHYSICS AND BIOCHEMISTRY | | | | |
| Batch 2023-2024 | Semester IV | Hours / Week 7 | Total Hours 105 | Credits 5 |

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

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| 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 |

23PBO411

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| Programme Code: 05 | | M.Sc., BOTANY | | |
| Core Paper 11: PLANT PHYSIOLOGY | | | | |
| Batch 2023-2024 | Semester IV | Hours / Week 7 | Total Hours 105 | Credits 5 |

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

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| 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. |

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| Programme Code: 05 | | M.Sc., BOTANY | | |
| Core Paper 12: BIOINSTRUMENTATION AND RESEARCH METHODOLOGY | | | | |
| Batch 2023-2024 | Semester IV | Hours / Week 6 | Total Hours 90 | Credits 5 |

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

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| 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 |

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| Programme Code: 05 | | M.Sc., BOTANY | | |
| Core Practical 4 - BIOPHYSICS, BIOCHEMISTRY, PLANT PHYSIOLOGY, BIOINSTRUMENTATION AND RESEARCH METHODOLOGY | | | | |
| Batch 2023-2024 | Semester IV | Hours / Week 4 | Total Hours 60 | Credits 2 |

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

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| 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 |

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| Programme Code: 05 | | M.Sc., BOTANY | | |
| PROJECT & VIVA – VOCE | | | | |
| Batch 2023-2024 | Semester IV | Hours / Week 2 | Total Hours 30 | Credits 5 |

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

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| 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 |

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| Programme Code: 05 | M.Sc., BOTANY | | |
| | Major Elective 1: FOREST RESOURCES AND CONSERVATION | | |
| Batch 2023-2024 | Hours / Week 5 | Total Hours 75 | Credits 5 |

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

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| 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. |

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| Programme Code: 05 | M.Sc., BOTANY | | |
| | Major Elective: 2 - SEED TECHNOLOGY | | |
| Batch 2023-2024 | Hours / Week 5 | Total Hours 75 | Credits 5 |

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

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| 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. |

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| Programme Code: 05 | M.Sc., BOTANY | | |
| | Major Elective 3 - FOOD SCIENCE AND NUTRITION | | |
| Batch 2023-2024 | Hours / Week 5 | Total Hours 75 | Credits 5 |

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

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| 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. |

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| Programme Code: 05 | M.Sc., BOTANY | | |
| | Major Elective 4: HORTICULTURE | | |
| Batch 2023-2024 | Hours / Week 5 | Total Hours 75 | Credits 5 |

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

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| 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 . |

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| Programme Code: 05 | M.Sc., BOTANY | | |
| | Major Elective 5: MOLECULAR BIOLOGY | | |
| Batch 2023-2024 | Hours / Week 5 | Total Hours 75 | Credits 5 |

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

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| 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 |

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| Programme Code: 05 | M.Sc., BOTANY | | |
| | Major Elective 6: ALGAL TECHNOLOGY | | |
| Batch 2023-2024 | Hours / Week 5 | Total Hours 75 | Credits 5 |

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

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| 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 |

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| Programme Code: 05 | M.Sc., BOTANY | | |
| | Major Elective 7: BIOFERTILIZERS AND SOLID WASTE MANAGEMENT | | |
| Batch 2023-2024 | Hours / Week 5 | Total Hours 75 | Credits 5 |

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

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| 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 |

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| Programme Code: 05 | M.Sc., BOTANY | | |
| | Major Elective 8: APPLIED MICROBIOLOGY | | |
| Batch 2023-2024 | Hours / Week 5 | Total Hours 75 | Credits 5 |

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

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| 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. |

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| Programme Code: 05 | M.Sc., BOTANY | | |
| | Non-Major Elective1: Herbal Medicine | | |
| Batch 2023-2024 | Hours / Week 4 | Total Hours 60 | Credits 4 |

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

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| 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 |

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| Programme Code: 05 | M.Sc., BOTANY | | |
| | Non-Major Elective 2: Biotechnology and Nanobiology | | |
| Batch 2023-2024 | Hours / Week 4 | Total Hours 60 | Credits 4 |

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

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| 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 |

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| Programme Code: 05 | M.Sc., BOTANY | | |
| | Non-Major Elective 3: Limnology | | |
| Batch 2023-2024 | Hours / Week 4 | Total Hours 60 | Credits 4 |

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 |

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| Programme Code: 05 | M.Sc., BOTANY | | |
| | Non-Major Elective 4: Advancements in Industry 4.0 | | |
| Batch 2023-2024 | Hours / Week 4 | Total Hours 60 | Credits 4 |

COURSE OBJECTIVES

- To know about the principles, applications and various tools for Industry 4.0
- To learn and familiarize on machine learning and its tools and applications
- To study the basic knowledge on robotic process automation
- To gain knowledge on cloud computing and its types
- To inculcate the virtual and augmented reality and its applications

COURSE OUTCOMES

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

| | | |
|--------------------|-----|--|
| K1 ↑ ↓ K5 | CO1 | Acquire knowledge on Industry 4.0 and its tools and applications |
| | CO2 | Understand the various types and algorithms of machine learning |
| | CO3 | Apply the robotic process automation in various industries |
| | CO4 | Elucidate the cloud computing and its types |
| | CO5 | Evaluate the tools and applications of virtual and augmented reality |

23PGI4N2

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| Programme Code: 05 | M.Sc., BOTANY | | | |
| | Non-Major Elective 5: Information Security | | | |
| Batch 2023-2024 | Semester IV | Hours / Week 4 | Total Hours 60 | Credits 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. |

23PBO3X1

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| Programme Code: 05 | | For PG STUDENTS | | |
| Extra Departmental Course (EDC) - APPLIED HORTICULTURE | | | | |
| Batch 2023-2024 | Semester III | Hours / Week 2 | Total Hours 30 | Credits 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 |

23PBO0J1

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| Programme Code: 05 | | M.Sc., BOTANY | |
| JOC 1: Floriculture and Landscaping | | | |
| Batch 2023-2024 | Hours / Week 4 | Credits 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 |

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| Programme Code: 05 | M.Sc., BOTANY | |
| JOC 2 : Food Processing and Preservation | | |
| Batch 2023-2024 | Hours / Week 4 | Credits 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 |