

J.J. College of Arts and Science (Autonomous), Pudukkottai
PG and Research Department of Botany
Course Outcomes – 2023 - 2024
M.Sc. Botany – PSBO
Semester - I

Course Name - PLANT DIVERSITY – I: ALGAE, FUNGI, LICHENS AND BRYOPHYTES		Course Code - P1R3BOCC1	Knowledge Level
On completion of this course, the students will be able to:			
CO1	Relate to the structural organizations of algae, fungi, lichens and Bryophytes.		K1
CO2	Demonstrate both the theoretical and practical knowledge in understanding the diversity of basic life forms and their importance.		K2
CO3	Explain life cycle patterns in algae, fungi, lichens and Bryophytes.		K3
CO4	Compare and contrast the mode of reproduction in diverse groups of basic plant forms.		K4
CO5	Discuss and develop skills for effective conservation and utilization of lower plant forms.		K5 & K6
Course Name - PLANT DIVERSITY – II (PTERIDOPHYTES, GYMNOSPERMS AND PALEOBOTANY)		Course Code - P1R3BOCC2	Knowledge Level
On successful completion of this course the student will be able to			
CO1	Recall on classification, recent trends in phylogenetic relationship, general characters of Pteridophytes and Gymnosperms.		K1 & K3
CO2	Learn the morphological/ anatomical organization, life history of major types of Pteridophytes and Gymnosperms.		K3 & K4
CO3	Comprehend the economic importance of Pteridophytes, Gymnosperms, and fossils.		K3 & K5
CO4	Understanding the evolutionary relationship of Pteridophytes and Gymnosperms.		K2
CO5	Awareness on fossil types, fossilization and fossil records of Pteridophytes and Gymnosperms.		K1 & K3
Course Name - CORE-III LABORATORY COURSE-I COVERING THEORY PAPERS I AND II		Course Code - P1R3BOCC3P	Knowledge Level
On completion of this course, the students will be able to:			
CO1	Recall and applying the basic keys to distinguish at species level identification of important algae and fungi through its structural organizations.		K1 & K4
CO2	Demonstrate practical skills in thallophytes, Pteridophytes and Gymnosperms.		K2
CO3	Describe the structure of algae, fungi, lichens, Bryophytes, Pteridophytes and Gymnosperms.		K3
CO4	Determine the importance of structural diversity in the evolution of plant forms.		K5
CO5	Formulate techniques to isolate and culture of alga and fungi as well as to understand the diversity of plant forms.		K5 & K6



Course Name – MICROBIOLOGY, IMMUNOLOGY AND PLANT PATHOLOGY		Course Code – PIR3BODSE1:1	Knowledge Level
On completion of this course, the students will be able to:			
CO1	Recognize the general characteristics of microbes, plant defense and immune cells.		K1
CO2	Explain about the stages in disease development and various defense mechanisms in plants and humans.		K2
CO3	Elucidate concepts of microbial interactions with plant and humans.		K3
CO4	Analyze the importance of harmful and beneficial microbes and immune system		K4
CO5	Determine and interpret the detection of pathogens and appreciate their adaptive strategies.		K5 & K6
Course Name – CONSERVATION OF NATURAL RESOURCES AND POLICIES		Course Code – PIR3BODSE1:2	Knowledge Level
On completion of this course, the students will be able to:			
CO1	Understand the concept of different natural resources and their utilization.		K1
CO2	Critically analyze the sustainable utilization land, water, forest and energy resources		K2 & K6
CO3	Evaluate the management strategies of different natural resources		K3
CO4	Reflect upon the different national and international efforts in resource management and their conservation.		K4
CO5	State the various environmental policy passed to conserve the natural resources.		K5
Course Name - MUSHROOM CULTIVATION		Course Code - PIR3BODSE1:3	Knowledge Level
On completion of this course, the students will be able to:			
CO1	Review on the traditional knowledge and classification of plant derived drugs.		K1, K3
CO2	Knowledge on biosynthetic pathway of different classes of plant metabolites.		K2, K4
CO3	Knowledge on modern instrumentation on characterization of plant metabolites.		K3, K6
CO4	Discuss various aspects of Pharmacological action of herbal drugs.		K4
CO5	Understanding medical and non-medical potential of plant derived in various sectors.		K5
Course Name – PHYTOPHARMACOGNOSY		Course Code – PIR3BODSE1:4	Knowledge Level
On completion of this course, the students will be able to:			
CO1	1. Review on the traditional knowledge and classification of plant derived drugs.		K1
CO2	2. Knowledge on biosynthetic pathway of different classes of plant metabolites.		K2
CO3	3. Knowledge on modern instrumentation on characterization of plant metabolites.		K3, K6
CO4	4. Discuss various aspects of Pharmacological action of herbal drugs.		K4 K5
CO5	5. Understanding medical and non-medical potential of plant derived in various sectors.		K6



Course Name - ALGAL TECHNOLOGY		Course Code – P1R3BODSE2: 1	Knowledge Level
On completion of this course, the students will be able to:			
CO1	Understand the applied facet of botany and acquire a complete knowledge about the cultivation methods in algae.		K1& K3
CO2	Realization of the commercial potential of algal products.		K5
CO3	Analyze emerging areas of algal biotechnology for identifying therapeutic importance of algal products and their uses.		K2 & K4
CO4	Gain more information about algae genetics.		K4
CO5	Translate various algal technologies for the benefit of the ecosystem.		K3 & K6

Course Name – ETHNOBOTANY, NATUROPATHY AND TRADITIONAL HEALTHCARE		Course Code – P1R3BODSE2:2	Knowledge Level
On completion of this course, the students will be able to:			
CO1	Recall or remember concept of ethnobotany.		K1
CO2	Understand the life style and traditional practices of plants by Indian tribals.		K2 & K6
CO3	Highlight the role of Non-Timber Forest products for livelihood of tribal people of India		K3
CO4	Assess the methods to transform ethnobotanical knowledge into value added products.		K4
CO5	Build idea to make digitization of ethnobotanical knowledge.		K5

Course Name - HORTICULTURE		Course Code - P1R3BODSE2:3	Knowledge Level
On completion of this course, the students will be able to:			
CO1	Identify and categorize various horticultural plants and the conditions that affect their growth and productivity.		K1
CO2	Explain the various structures and growth processes of horticultural plants.		K2
CO3	Demonstrate the propagation, growth, and maintenance of plants in horticulture systems.		K3
CO4	Correlate the soil characteristics and fertility to good plant growth.		K4
CO5	Utilize the role plant tissue culture techniques in the production of quality planting stock in horticulture.		K5

Course Name - HERBAL TECHNOLOGY		Course Code – P1R3BODSE2:4	Knowledge Level
On completion of this course, the students will be able to:			
CO1	Recollect the importance of herbal technology.		K1
CO2	Understand the classification of crude drugs from various botanical sources.		K2
CO3	Analyze on the application of secondary metabolites in modern medicine.		K3
CO4	Create new drug formulations using therapeutically valuable phytochemical compounds for the healthy life of society.		K4
CO5	Comprehend the current trade status and role of medicinal plants in socio economic growth.		K5 & K6

Course Name - NURSERY AND GARDENING	Course Code – P1R3BOSEC1	Knowledge Level
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On completion of this course, the students will be able to:		
CO1	Recognize the basic process required for growing and maintaining plants in nurseries.	K1
CO2	Explain the different methods of plant propagation and various gardening styles.	K2
CO3	Apply techniques for effective hardening of plants and computer applications for creative gardening.	K3& K6
CO4	Compare and contrast cultivation of different vegetables and growth of plants in nursery and gardening.	K4
CO5	Develop new strategies to enhance growth and quality of nursery plants ³ .	K5 & K6
Course Name : INTRODUCTION TO STUDY SKILLS		Course Code: P1R3AECC1
		Knowledge Level
On completion of this course, students will;		
CO1	Use Language with appropriacy and acceptability	K1
CO2	Develop skills in using dictionaries and sources available in the web and other internet applications.	K2
CO3	Acquire expertise in the art of documentation.	K3& K6
CO4	Use statistical tools and test hypotheses.	K4
CO5	Evaluate and understand the Structure and conventions of discourse.	K5 & K6



Semester – II

Course Name – TAXONOMY OF ANGIOSPERMS AND ECONOMIC BOTANY		Course Code – P2R3BOCC4	Knowledge Level
On completion of this course, the students will be able to:			
CO1	Recollect the basic concepts of morphology of leaves, flowers. Identify the types of compound leaves, inflorescence and fruits. Describe their characteristic features.		K1, K2 K3
CO2	Explain the principles of taxonomy. Summarize the taxonomic hierarchy. Define Binomial nomenclature. Group Activity -Construct key preparation.		K1, K2 K5, K6
CO3	Explain the various types of classification. Distinguish its advantages and disadvantages. Construction of floral formula and floral diagram.		K1, K2 K3, K4
CO4	Illustrate and explain the characteristic features and list out the economic importance of the families. Field trip to local botanical garden and regional botanical garden.		K1, K2 K3, K4
CO5	Illustrate and explain the characteristic features and list out the economic importance of the families.		K1, K2 K3, K5
Course Name – PLANT ANATOMY AND EMBRYOLOGY OF ANGIOSPERMS		Course Code – P2R3BOCC5	Knowledge Level
On completion of this course, the students will be able to:			
CO1	Learn the structures, functions and roles of apical vs lateral meristems in monocot and dicot plant growth.		K1 & K2
CO2	Study the function and organization of woody stems derived from secondary growth in dicot and monocot plants.		K1 & K4
CO3	Apply their idea on sectioning and dissection of plants to demonstrate various stages of plant development.		K2 & K6
CO4	Understand the various concepts of plant development and reproduction.		K3 & K6
CO5	Profitably manipulate the process of reproduction in plants with a professional and entrepreneurial mindset.		K5
Course Name - ECOLOGY, PHYTOGEOGRAPHY, CONSERVATION BIOLOGY & INTELLECTUAL PROPERTY RIGHTS		Course Code – P2R3BOCC6	Knowledge Level
On completion of this course, the students will be able to:			
CO1	Understand the scope and importance of population ecology, plant communities and ecosystem ecology.		K1 & K2
CO2	Understand the applied aspect of environmental botany.		K1 & K4
CO3	Students will spot the sources and pollution and seek remedies to mitigate and rectify them.		K2 & K6
CO4	Identify different plant communities, categorize plant biomes and identify threatened, endangered plant species and create awareness program in protection of biodiversity.		K3 & K6
CO5	Analyze insight into the vegetation types, species interaction and their importance and the factors influencing the environmental conditions.		K5
Course Name - LABORATORY COURSE-II (Covering Core Papers IV, V and VI)		Course Code – P2R3BOCC7P	Knowledge Level
On completion of this course, the students will be able to:			



CO1	To gain recent advances in plant morphological and floral characteristics.	K1
CO2	Understand about different floral characteristics and artificial key preparation which employed for plant identification and conservation.	K2
CO3	Recall or remember the information including basic and advanced in relation with plant anatomy and embryology.	K4 & K5
CO4	Apply their idea on sectioning and dissection of plants to demonstrate various stages of plant development.	K3
CO5	Know about different vegetation sampling methods.	K3
Course Name - MEDICINAL BOTANY		Course Code – P2R3BODSE3:1
		Knowledge Level
On completion of this course, the students will be able to:		
CO1	Recognize plants and relate to their medicinal uses	K1
CO2	Explain about the phytochemistry, pharmacognosy and bioprospecting of medicinal plant extracts.	K2
CO3	Apply techniques for conservation and propagation of medicinal plants.	K3
CO4	Analyze and decipher the significance of various methods of harvesting, drying and storage of medicinal herbs.	K4
CO5	Develop new strategies to enhance growth and quality check of medicinal herbs considering the practical issues pertinent to India.	K5 & K6
Course Name – PHYTOCHEMISTRY		Course Code – P2R3BODSE3:2
		Knowledge Level
On completion of this course, the students will be able to:		
CO1	Understand the role of plants in the survival of human beings and other organisms	K1
CO2	Recognition of the contribution made by primitive people in exploration of plant knowledge to alleviate common diseases and development of systems of medicine.	K2
CO3	Gaining knowledge on different classes of phytochemicals present in higher and lower plants species.	K3
CO4	Demonstrate the various aspects of extraction, isolation and characterization of secondary metabolites.	K4 & K5
CO5	Know the methods of screening of secondary metabolites for various biological properties.	K6
Course Name - RESEARCH METHODOLOGY, COMPUTER APPLICATIONS & BIOINFORMATICS		Course Code - P2R3BODSE2:3
		Knowledge Level
Course Outcomes: On completion of this course, the students will be able to:		
CO1	Realize the need of centrifuges and chromatography and their uses in research	K1 & K2
CO2	Learn the principles and applications of electrophoresis.	K2 & K3
CO3	Construct the phylogenetic trees for similar characteristic feature of plant genomes and study <i>de novo</i> drug design through synthetic biology.	K5 & K6
CO4	Understand the concept of pairwise alignment of DNA sequences using algorithms.	K3 & K4
CO5	Interpret the features of local and multiple alignments.	K4 & K5



Course Name - BIOPESTICIDE TECHNOLOGY		Course Code – P2R3BODSE3:4	Knowledge Level
On completion of this course, the students will be able to:			
CO1	Understand the issues in use of chemical pesticides and their harmful effects on life.		K1 & K2
CO2	Aware the significance of biopesticides and their beneficial role in controlling insect pests, diseases, nematodes and weeds.		K1 & K4
CO3	Knowledge on identification of promising biopesticides and their mechanisms of action against insect pests, diseases, nematodes and weeds.		K2 & K6
CO4	Learn the mass production and formulation technology of selected biopesticides.		K3 & K6
CO5	Knowledge on product development for commercialization of biopesticides.		K5
Course Name - APPLIED BIOINFORMATICS		Course Code – P2R3BODSE4:1	Knowledge Level
On completion of this course, the students will be able to:			
CO1	Familiarize with the tools of DNA sequence analysis.		K1 & K2
CO2	Use and explain the application of bioinformatics.		K2 & K3
CO3	Master the aspects of protein-protein interaction, BLAST and PSI-BLAST.		K3 & K4
CO4	Describe the features of local and multiple alignments.		K3 & K4
CO5	Interpret the characteristics of phylogenetic methods and bioinformatics applications.		K4 & K5
Course Name – BIOSTATISTICS		Course Code – P2R3BODSE4:2	Knowledge Level
On completion of this course, the students will be able to:			
CO1	Create and interpret visual representations of quantitative information, such as graphs or charts.		K5 & K6
CO2	Solve problems quantitatively using appropriate arithmetical, algebraic, or statistical methods		K3 & K5
CO3	Know the latest version using in statistical tools and apply the tools to interpret the results		K2
CO4	To develop their competence in hypothesis testing and interpretation.		K4
CO5	Understand why biologists need a background in statistics.		K1
Course Name - INTELLECTUAL PROPERTY RIGHTS		Course Code - P2R3BODSE4:3	Knowledge Level
On completion of this course, the students will be able to:			
CO1	Recall the history and foundation of Intellectual Property.		K1
CO2	Understand the differences of Property and Assets and Various Categories of Intellectual Creativity.		K2
CO3	Apply the methods to protect the Intellectual Property.		K3
CO4	Differentiate if the Said Intangible property be protected under law or protected by strategy.		K4
CO5	Create a recommendation document on the methods and procedures of protecting the said IP and search documents to substantiate them.		K5 & K6



Course Name - NANOBIO TECHNOLOGY		Course Code - P2R3BODSE4:4	Knowledge Level
On completion of this course, the students will be able to:			
CO1	Recall the essential features of biology and nanotechnology that are converging to create the new area of bionanotechnology.		K1
CO2	Formulate procedures for the synthesis of nanoparticles which are of medical importance which could be used to treat specific diseases.		K2
CO3	Characterize the various types of nano particle synthesis and advocate promotes the use of nano materials and anno composites.		K3
CO4	Analyze and apply the important of nanoparticles in plant diversity.		K4
CO5	Construct various types of nanomaterial for application and evaluate the impact on environment.		K5 & K6
Course Name - AGRICULTURE AND FOOD MICROBIOLOGY-II		Course Code – P2R3BOSEC2	Knowledge Level
On completion of this course, the students will be able to:			
CO1	Recognize the general characteristics of microbes and factors affecting its growth		K1
CO2	Explain the significance of microbes in increasing soil fertility		K2
CO3	Elucidate concepts of microbial interactions with plant and food.		K3
CO4	Analyze the impact of harmful microbes in agriculture and food industry		K4
CO5	Determine and appreciate the role of microbes in food preservation and as biocontrol.		K5 & K6
Course Name - LIFE SKILLS		Course Code – P2R3AECC2	Knowledge Level
On completion of this course, the students will be able to:			
CO1	Practice the right type of attitudes and approaches to life		K1
CO2	Become successful professionals and team leaders		K2
CO3	Achieve a proper self image and develop into complete men		K3 & K5
CO4	Cope with stress and conflict		K4
CO5	Acquire self awareness and live as responsible citizens		K5 & K6

HEAD OF THE DEPARTMENT

Dr. M. Arumugam, M.Sc. M.Phil., Ph.D.
Assistant Professor & Head
PG and Research Dept. of Botany
J.J. College of Arts and Science
Sivapuram, Pudukkottai - 622 422
Tamil Nadu, India.



PRINCIPAL

Dr. J. PARASURAMAN, M.A., M.B.A., M.C.A., M.Phil., B.Ed., Ph.D.
PRINCIPAL
J.J. College of Arts and Science (Autonomous)
J.J. Nagar, Sivapuram Post,
PUDUKKOTTAI - 622 422.