

UNIVERSITY OF MADRAS
B.Sc. DEGREE PROGRAMME IN CHEMISTRY
 SYLLABUS WITH EFFECT FROM 2023-2024

ELECTIVE-I: BOTANY-I

Title of the Course		BOTANY-I					
Paper Number		Elective-I					
Category	Elective	Year	I	Credits	3	Course Code	124E1B
		Semester	I				
Instructional Hours per week		Lecture	Tutorial	Lab Practice	Total		
		3	1	-	4		
Pre-requisite		To study the basics of botany.					
Learning Objectives							
C1	To study morphological and anatomical adaptations of plants of various habitats.						
C2	To demonstrate techniques of plant tissue culture.						
C3	To familiarize with the structure of DNA, RNA.						
C4	To carryout experiments related with plant physiology.						
C5	To perform biochemistry experiments.						
Course outcomes: CO	On completion of this course, the students will be able to:						Programme outcomes
CO1	Increase the awareness and appreciation of human friendly algae and their economic importance.						K1
CO2	Develop an understanding of microbes and fungi and appreciate their adaptive strategies.						K2
CO3	Develop critical understanding on morphology, anatomy and reproduction of Bryophytes, Pteridophytes and Gymnosperms.						K3
CO4	Compare the structure and function of cells and explain the development of cells.						K4
CO5	Understand the core concepts and fundamentals of plant biotechnology and genetic engineering.						K5
UNIT	CONTENTS						
I	Algae: General characters of algae - Structure, reproduction and life cycle of the following genera - <i>Anabaena</i> and <i>Sargassum</i> and economic importance of algae.						
II	Fungi, Bacteria and Virus: General characters of fungi, structure, reproduction and life cycle of the following genera - <i>Penicillium</i> and <i>Agaricus</i> and economic importance of fungi. Bacteria - general characters, structure and reproduction of <i>Escherichia coli</i> and economic importance of bacteria. Virus - general characters, structure of TMV, structure of bacteriophage.						

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III	Bryophytes, Pteridophytes and Gymnosperms: General characters of Bryophytes, Structure and life cycle of <i>Funaria</i> . General characters of Pteridophytes, Structure and life cycle of <i>Lycopodium</i> . General characters of Gymnosperms, Structure and life cycle of <i>Cycas</i> .	
IV	Cell Biology: Prokaryotic and Eukaryotic cell- structure /organization. Cell organelles - ultra structure and function of chloroplast, mitochondria and nucleus. Cell division - mitosis and meiosis.	
V	Genetics and Plant Biotechnology: Mendelism - Law of dominance, Law of segregation, Incomplete dominance. Law of independent assortment. Monohybrid and dihybrid cross - Test cross - Back cross. Plant tissue culture - <i>In vitro</i> culture methods. Plant tissue culture and its application in biotechnology.	
Extended Professional Component (is a part of internal component only, Not to be included in the External Examination question paper)		Questions related to the above topics, from various competitive examinations UPSC / TRB / NET / UGC – CSIR / GATE / TNPSC /others to be solved (To be discussed during the Tutorial hour)
Skills acquired from this course		Knowledge, Problem Solving, Analytical ability, Professional Competency, Professional Communication and Transferrable Skill
Recommended Texts	<ol style="list-style-type: none"> Singh, V., Pande, P.C and Jain, D.K. 2021. A Text Book of Botany. Rastogi Publications, Meerut. Bhatnagar, S.P and Alok Moitra. 2020. Gymnosperms, New Age International (P) Ltd., Publishers, Bengaluru. Sharma, O.P. 2017. Bryophyta, MacMillan India Ltd. Delhi. Lee, R.E. 2008. Phycology, IV Edition, Cambridge University Press, New Delhi. Rao, K., Krishnamurthy, K.V and Rao, G.S. 1979. Ancillary Botany, S. Viswanathan Pvt. Ltd., Madras. 	
Reference books:	<ol style="list-style-type: none"> Parihar, N.S. 2012. An introduction to Embryophyta –Pteridophytes - Surjeet Publications, Delhi. Alexopoulos, C.J. 2013. Introduction to Mycology. Willey Eastern Pvt. Ltd. Vashishta, P.C. 2014. Botany for Degree Students Gymnosperms. Chand & Company Ltd, Delhi. Coulter, M. Jhon, 2014. Morphology of Gymnosperms. Surjeet Publications, Delhi. Vashishta, P.C. 2014. Botany for Degree Students Algae. 2014. Chand & Company Ltd, Delhi. Parihar, N.S. 2013. An introduction to Embryophyta –Bryophytes -, Surjeet Publications, Delhi. Pandey B.P. 1986, Text Book of Botany (College Botany) Vol I &II, S.Chand and Co. New Delhi. 	

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Web Resources	https://www.kobo.com/us/en/ebook/the-algae-world http://www.freebookcentre.net/biology-books-download/Fungi-(PDF-15P).html http://scitec.uwichill.edu.bb/bcs/b114apl/bryo1.htm https://www.toppr.com/guides/biology/plant-kingdom/pteridophytes/ https://arboretum.harvard.edu/wp-content/uploads/2013-70-4-beyond-pine-cones-an-introduction-to-gymnosperms.pdf https://www.us.elsevierhealth.com/medicine/cell-biology https://www.us.elsevierhealth.com/medicine/genetics https://www.kobo.com/us/en/ebook/plant-biotechnology-1
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Mapping with Programme Outcomes:

COs	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO 1	3	3	3	3	3	3	3	3	3	3
CO 2	3	3	3	3	3	3	3	3	3	3
CO 3	2	3	3	3	3	1	3	3	3	3
CO 4	3	3	2	3	3	3	2	3	2	3
CO 5	3	2	2	2	2	2	2	1	2	1

S-Strong (3) M-Medium (2) L-Low(1)