

UNIVERSITY OF MADRAS
B.Sc. DEGREE PROGRAMME IN PLANT BIOLOGY
AND PLANT BIOTECHNOLOGY
SYLLABUS WITH EFFECT FROM 2023-2024

FOUNDATION COURSE FOR BOTANY
BASICS OF BOTANY

Title of the Course		BASICS OF BOTANY					
Paper Number		Foundation Course					
Category	FC	Year	I	Credits	2	Course Code	139B1A
		Semester	I				
Instructional Hours per week	Lecture	Tutorial		Lab Practice	Total		
	2	-		-	2		
Pre-requisite		To recall the students about the basic aspects of botany.					
Learning Objectives							
C1	To learn about the classification, distinguishing traits, geographic distribution, and reproductive cycle of algae, fungi, lichens, and bryophytes.						
C2	To understand the biodiversity by describing and explaining the morphology and reproductive processes of algae, fungi, bryophytes and microorganisms.						
C3	To investigate the classification, distinctive traits, distribution and reproduction and life history of the various classes and major types of Pteridophytes and Gymnosperms.						
C4	Enable to learn various cell structures and functions of prokaryotes and eukaryotes and understand the salient features and functions of cellular organelles.						
C5	Understanding of laws of inheritance, genetic basis of loci and alleles.						
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	BIODIVERSITY Salient features of various Plant Groups: Algae, Fungi, Bryophytes, Pteridophytes and Gymnosperms- Viruses - Bacteria.						

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II	CELL BIOLOGY Cell as the basic unit of life - Prokaryotic and Eukaryotic Cell (Plant Cell) - Ultra Structure of Prokaryotic and Eukaryotic Cells - Cell Wall - Cell Membrane Plastids and Mytochondria.	
III	PLANT MORPHOLOGY Structure and Modification of Root, Stem and Leaf - Structure and Types of Inflorescences - Structure and Types of Fruits and Seeds.	
IV	GENETICS Concept of Heredity and Variation - Mendel's Laws of Inheritance.	
V	PLANT PHYSIOLOGY Cell as a Physiological Unit: Water relations -Absorption and movement: Diffusion, Osmosis, Plasmolysis, Imbibition -Permeability, Water Potential.	
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"> 1. Singh, V., Pande, P.C and Jain, D.K. 2021. A Text Book of Botany. Rastogi Publications, Meerut. 2. Bhatnagar, S.P and Alok Moitra. 2020. Gymnosperms, New Age International (P) Ltd., Publishers, Bengaluru. 3. Sharma, O.P. 2017. Bryophyta, MacMillan India Ltd. Delhi. 4. Lee, R.E. 2008. Phycology, IV Edition, Cambridge University Press, New Delhi. 5. Pandey B.P. 1986, Text Book of Botany (College Botany) Vol I and II, S.Chand and Co. New Delhi. 6. 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"> 1. Parihar, N.S. 2012. An introduction to Embryophyta –Pteridophytes - Surjeet Publications, Delhi. 2. Alexopoulos, C.J. 2013. Introduction to Mycology. Willey Eastern Pvt.Ltd. 3. Vashishta, P.C. 2014. Botany for Degree Students Gymnosperms. Chand & Company Ltd, Delhi. 4. Coulter, M. Jhon, 2014. Morphology of Gymnosperms. Surjeet Publications, Delhi. 1. Vashishta, P.C. 2014. Botany for Degree Students Algae. 2014. Chand & Company Ltd, Delhi. 2. Parihar, N.S. 2013. An introduction to Embryophyta –Bryophytes -, Surjeet Publications, Delhi. 	

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Web Resources	<ol style="list-style-type: none"> 1. https://www.kobo.com/us/en/ebook/the-algae-world 2. http://www.freebookcentre.net/biology-books-download/Fungi-(PDF-15P).html 3. http://scitec.uwichill.edu.bb/bcs/bl14apl/bryo1.htm 4. https://www.toppr.com/guides/biology/plant-kingdom/pteridophytes/ 5. https://arboretum.harvard.edu/wp-content/uploads/2013-70-4-beyond-pine-cones-an-introduction-to-gymnosperms.pdf 6. https://www.us.elsevierhealth.com/medicine/cell-biology 7. https://www.us.elsevierhealth.com/medicine/genetics 3. 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	1	3
CO 4	3	3	2	3	3	3	3	2	3	3
CO 5	3	2	2	2	2	2	2	1	2	2

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