

UNIVERSITY OF MADRAS
M.Sc. DEGREE PROGRAMME IN BOTANY
SYLLABUS WITH EFFECT FROM 2023-2024

Title of the Course		PLANT DIVERSITY – II (PTERIDOPHYTES, GYMNOSPERMS AND PALEOBOTANY)					
Paper Number		CORE II					
Category	Core	Year	I	Credits	5	Course Code	423C1B
		Semester	I				
Instructional Hours per week		Lecture	Tutorial	Lab Practice	Total		
		4	2	-	6		
Pre-requisite		Students should know about the fundamentals of Pteridophytes, Gymnosperms and fossil records.					
Learning Objectives:							
C1	To investigate the classification, distinctive traits, distribution and reproduction and life history of the various classes and major types of Pteridophytes and Gymnosperms						
C2	To identify and characterize diversity of lower vascular plants in order to comprehend the dynamics of diversity to realize the importance of diversity						
C3	To research the classification and economic importance of Pteridophytes and Gymnosperms.						
C4	To study and understand the phylogeny and Paleontology of Pteridophytes and Gymnosperms						
C5	To learn about the concept of fossils and process of fossilization; distinctive characteristics of fossil records of Pteridophytes and Gymnosperms.						
UNIT	CONTENTS						
I	PTERIDOPHYTES: General characteristics and classification (Reimer, 1954). Range of structure, reproduction and evolution of the gametophytes, Gametophyte types – sex organs. Apogamy and Apospory. Life cycles. Stellar evolution. Heterospory and seed habit, Telome theory, morphogenesis, Economic importance of Pteridophytes.						
II	PTERIDOPHYTES: External morphology and internal anatomy of the vegetative, reproduction, life cycles of the following genera: <i>Azolla</i> , <i>Adiantum</i> , <i>Angiopteris</i> and <i>Pteris</i> .						
III	GYMNOSPERMS: General characters - A general account of distribution of Gymnosperms. Morphology, anatomy, reproduction, phylogeny and classification (K.R.Sporne, 1965). Economic importance of Gymnosperms.						
IV	GYMNOSPERMS: Structure (Exomorphic and endomorphic), anatomy, reproduction and life cycles of the following genera: <i>Cupressus</i> , <i>Araucaria</i> , <i>Podocarpus</i> and <i>Ephedra</i> .						
V	PALEOBOTANY: Geological Scale; Radiocarbon dating; Contribution of Birbal Sahni to Paleobotany. Gondwana flora of India. Fossilization and fossil types. Economic importance of fossils – fossil fuels. Study of organ genera: <i>Sphenophyllum</i> and <i>Cordaites</i> .						

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Course Outcomes: CO	Completion of this course the student will be able to	Programme Outcomes
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
K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 – Create.		
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 Text:

- Vashishta, P.C. Sinha, A.K and Anil Kumar. 2016. Botany for Degree students. Gymnosperms. S. Chand and Company Ltd., New Delhi.
- 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. Pteridophyta, McGraw Hill Education, New York.
- Vashishta. P.C., A.K. Sinha and Anil Kumar. 2018. Botany for Degree students - Gymnosperms. S. Chand and Company Ltd., New Delhi.
- Johri, R.M, Lata, S, Tyagi, K. 2005. A text book of Gymnosperms, Dominant pub and Distributer, New Delhi.

Reference books:

- Parihar, N.S. 2019. An Introduction to Embryophyta Pteridophytes. 5th Edition, Surjeet Publication, Delhi.
- Pandey, S.N and Trivedi, P.S. 2015. A Text Book of Botany Vol. II- 12th edition (Paper back), Vikas Publishing.
- Rashid, A. 2013. An introduction to Pteridophyta – Diversity, Development and differentiation (2nd edition), Vikas Publications.

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4. Arnold A.C. 2005. An Introduction to Paleobotany. Agrobios (India). Jodhpur.
5. Sporne, K.R. 2017. The morphology of Pteridophytes (The structure of Ferns and Allied Plants) (Paper back), Andesite Press.
6. Sporne, K.R. 1967. The Morphology of Gymnosperms. Hutchinson & Co., London.
7. Taylor, E, Taylor, T, Krings, M. 2008. Paleobotany: The Biology and Evolution of Fossil Plants, 2nd Edition, Academic Press.

Web resources:

1. <https://www.toppr.com/guides/biology/plant-kingdom/pteridophytes/>
2. http://www.bsiervis.nic.in/Database/Pteridophytes-in-India_23432.aspx
3. https://books.google.co.in/books?hl=en&lr=&id=Pn7CAAQBAJ&oi=fnd&pg=PA1&dq=Introduction+to+Gymnosperms&ots=sfYSzCL02&sig=ysX1KRvetV0bAza4Sq6RWau4XU8&redir_esc=y#v=onepage&q=Introduction%20to%20Gymnosperms&f=false
4. https://books.google.co.in/books/about/Botany_for_Degree_Gymnosperm_Multicolor.html?id=HTdFYFNxnWQC&redir_esc=y
5. <https://books.google.co.in/books/about/Gymnosperms.html?id=4dvyNckni8wC>
6. <https://arboretum.harvard.edu/wp-content/uploads/2013-70-4-beyond-pine-cones-an-introduction-to-gymnosperms.pdf>
7. <https://www.palaeontologyonline.com/>
8. <https://books.google.co.in/books/about/Paleobotany.html?id=HzYUAQAIAAJ>
<https://trove.nla.gov.au/work/11471742?q&versionId=46695996>

Mapping with Programme Outcomes:

COs	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	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	3	2	3	2
CO 5	3	2	2	2	2	2	2	1	2	1

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