

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

CORE-VII PLANT DIVERSITY IV GYMNOSPERMS, PALEOBOTANY AND EVOLUTION

Title of the Course	PLANT DIVERSITY IV GYMNOSPERMS, PALEOBOTANY AND EVOLUTION						
Paper Number	CORE VII						
Category	Core	Year	II	Credits	5	Course Code	239C4A
		Semester	IV				
Instructional Hours per week		Lecture	Tutorial	Lab Practice	Total		
		4	1	-	5		
Pre-requisite		Students should know about the fundamentals of Gymnosperms, fossil records and evolution.					
Learning Objectives							
C1	To enable the students to understand thallus organization,						
C2	To enable the students to understand internal and the reproductive structures of Gymnosperms and the importance of evolution.						
C3	to acquaint students with evidences of the past history of plant groups and significance of the fossilization.						
C4	To know the scope of paleobotany, types of fossils and geological time scale.						
C5	Understand the various fossil genera representing different fossil groups.						
Course outcomes: On completion of this course, the students will be able to: CO	Programme Outcomes						

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1. Relate to the general characteristics of Gymnosperms and fossil forms	K1
2. Explain about the morphology and anatomy Gymnosperms.	K2
3. Compare and contrast the reproductive structures of Gymnosperms & fossil forms.	K3
4. Analyze the anatomy and reproduction Gymnosperms along with their ecological and economical importance.	K4
5. Determine the various fossilization methods and their significance in paleobotany.	K5
UNIT	CONTENTS
I	GYMNOSPERMS General characteristics, Classification of Gymnosperms (Sporne, 1954) (up to family). Economic importance of Gymnosperms with special reference to oil,

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	resin, timber, etc.
II	GYMNOSPERMS Morphology, anatomy and reproduction of the taxa belonging to each of the following orders: Cycadales (<i>Cycas</i>), Coniferales (<i>Pinus</i>). Gnetales (<i>Gnetum</i>).
III	PALEOBOTANY Introduction to fossils and fossilization processes - compression, casts, molds, petrification, impressions and coal balls. Geological time scale. Radiocarbon dating. Contribution of Birbal Sahni
IV	PALEOBOTANY Study of the following fossils: Rhynia, Lepidodendron, Lepidocarpon, Calamites and Williamsonia seawardiana.
V	EVOLUTION Evolution - origin of life, chemosynthetic theory - evidences (any five). Theories of evolution - Darwin, Lamark and De veries, modern synthetic theory. Variation - analysis and sources, adaptive radiation, Concept of species - Allopatric and sympatric.
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

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Recommended Texts	<ol style="list-style-type: none"> Gupta, M.N. 1972. The Gymnosperms (2nd Edition) Shiva Lal Agarwala & Co., Agra. Vashista, P.C. 1976. Gymnosperms, S.Chand & Co. New Delhi. Bhatnagar, S.P and Moitra, A. 1996. Gymnosperms. New Age International Publishers, New Delhi, India. Anil Kumar. 2006. Gymnosperms. S. Chand & Company Pvt. Ltd. New Delhi. Bhatnagar S.P and Alok Moitra. 2013. Gymnosperms. Publisher: New Age International Pvt Ltd Publishers. New Delhi.
Reference Books	<ol style="list-style-type: none"> Sporne, K.R.1991. The Morphology of Gymnosperme. B.I. Publications, New Delhi. Bhatnagar, S.P and Moitra, A. 1996. Gymnosperms, New Age Int. Pvt. Ltd., New Delhi. Stewart, W.N and Rathwell, G.W. 1993. Paleobotany and the Evolution of Plants. Cambridge University Press. Raup, D.M and Steven, M. Stanley. 2004. Principles of paleontology. San Francisco: W.H. Freeman, 1971. Bhatnagar S.P and Alok Moitra. 2013. Gymnosperms. Publisher: New Age International Pvt Ltd Publishers. New Delhi.
Web Resources	<ol style="list-style-type: none"> https://books.google.co.in/books?hl=en&lr=&id=Pn7CAAAQBAJ&oi=fnd&pg=PA1&dq=Introduction+to+Gymnosperms&ots=sfYSzCL02&sig=ysX1KRvetV0bAza4Sq6RWau4XU8&redir_esc=y#v=onepage&q=Introduction%20to%20Gymnosperms&f=false https://books.google.co.in/books/about/Botany_for_Degree_Gymnosperm_Multicolor.html?id=HTdFYFNxnWQC&redir_esc=y https://books.google.co.in/books/about/Gymnosperms.html?id=4dvyNckni8wC https://arboretum.harvard.edu/wp-content/uploads/2013-70-4-beyond-pine-cones-an-introduction-to-gymnosperms.pdf https://www.palaeontologyonline.com/

Mapping with Programme Outcomes:

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

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CO 4	3	3	3	3	3	2	3	3	3	3
CO 5	3	3	2	3	2	2	1	3	1	3

S-Strong (3)

M-Medium (2)

L-Low(1)

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