UNIVERSITY OF MADRAS

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

CORE-VIII PLANT DIVERSITY IV GYMNOSPERMS, PALEOBOTANY AND EVOLUTION - PRACTICAL-IV

Title of the Course	**PLANT DIVERSITY IV GYMNOSPERMS, PALEOBOTANY AND EVOLUTION - PRACTICAL-IV**						
Paper Number	CORE VIII						
Category	Core	**Year**	II	**Credits**	2	**CourseCode**	239C41
		Semester	IV				

Instructional Hours per week	**Lecture**	**Tutorial**	**Lab Practice**	**Total**
		-	3	3

Pre-requisite	Students should be familiar with the fundamentals of Gymnosperms, Paleobotany.

Learning Objectives

C1	To enable students observe and record the morphological features of selected species of Gymnosperms.
C2	To enable students observe and record the anatomical features of selected species of Gymnosperms.
C3	To develop the skill of preparation of microslides of the gymnosperm samples.
C4	To enable students to gain insights into the basics of paleobotany and methods of fossilization.
C5	To understand the anatomy of the fossil plants through microscopy.

Course outcomes: On completion of this course, the students will be able to: CO	**Programme Outcomes**

1. Analyze and observe and record the morphological features of selected species of Gymnosperms..	K1
2. Describe the structure of fossil forms prescribed in the syllabus.	K2
3. Identify and Illustrate the morphological and anatomical features of gymnosperms.	K3
4. Develop comprehensive skills in sectioning and micro preparation.	K4
5. Interpret the significance of reproductive structures in gymnosperms.	K5

EXPERIMENTS

1. Study of morphology, anatomy and structure of the vegetative and reproductive organs of *Cycas,*

Pinus and *Gnetum.* 2. Identifying the micro slides relevant to the syllabus. 3. Field visit to study the habitat (Hill station). 4. Study the following fossil members: *Rhynia*, *Lepidodendron*, *Lepidocarpon, Calamites* and *Williamsonia sewardiana* through permanent slides. 5.Photograph of evolution scientists.	
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 competitiveexaminations 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	1. Sharma O.P and S, Dixit. 2002. Gymnosperms. Pragati Prakashan. 2. Gangulee, H.C and A.K. Kar. 2013. College Botany. Vth Edition. S. Chand. 3. Sharma, O.P. 2012. Textbook of Pteridophyta, TATA MacMillan India Ltd., New Delhi. 4. Chamberlain, C.J. 1934. Gymnosperms: Structure and Evolution. Chicago Reprinted 1950). New York. 5. Bhatnagar, S.P and Moitra, A. 1996. Gymnosperms. New Age International Publishers, New Delhi, India.
Reference Books	1. Smith, G.M. 1955. Cryptogamic Botany Vol.II. Tata McGraw Hill. New Delhi. 2. James.W. Byng. 2015. The Gymnosperms practical hand book. A practical guide to extant families and genera of the world. Published by plant Gateway, Tol Bot Street, Herford, SG137BX, United Kingdom. 3. Sharma, O.P. 2012. Textbook of Pteridophyta, TATA MacMillan India Ltd., New Delhi. 4. Chamberlain, C.J. 1934. Gymnosperms: Structure and Evolution. Chicago Reprinted 1950). New York.

	5. Kirkaldy, J.E. 1963. The study of Fossils. Hutchinson Educational, London.
Web resources	1. https://www.google.co.in/books/edition/Gymnosperms/3YrT5E3Erm8C?hl=en&gbpv=1&dq=gy mnosperms&printsec=frontcover 2. https://www.amazon.in/Paleobotany-Biology-Evolution-Fossil-Plants/dp/0123739721 3. https://books.google.co.in/books/about/Paleobotany.html?id=HzYUAQAAIAAJ 4. https://trove.nla.gov.au/work/11471742?q&versionId=46695996 5. http://www.freebookcentre.net/Biology/Evolutionary-Biology-Books.html.

Mapping with Programme Outcomes:

COs	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	3	2	3	2	1	2	2	2	3
CO 2	3	3	2	2	3	3	2	3	2	2
CO 3	2	2	3	3	1	2	1	3	3	3
CO 4	3	3	3	3	3	2	2	3	3	3
CO 5	3	3	2	2	3	3	2	3	2	2

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