

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

Title of the Course		CORE-III LABORATORY COURSE-I COVERING THEORY PAPERS I AND II					
Paper Number		CORE III					
Category	Core	Year	I	Credits	4	Course Code	423C1C
		Semester	I				
Instructional Hours per week		Lecture	Tutorial	Lab Practice	Total		
		4	-	4	8		
Pre-requisite		Students should be familiar with the fundamentals of algae, fungi, lichens, Bryophytes, Pteridophytes, Gymnosperms, Paleobotany and microbes in addition to essential laboratory techniques.					
Learning Objectives							
C1		To learn how to employ the use of instruments, technologies and methodologies related to thallophytes and non-flowering plant groups.					
C2		To enhance information on the identification of each taxonomical group by developing the skill-based detection of the morphology and microstructure of algae, and fungi.					
C3		To comprehend the fundamental concepts and methods used to identify Bryophytes, Pteridophytes and Gymnosperms through morphological changes and evolution, anatomy and reproduction.					
C4		To develop the technical abilities in staining, sectioning, sterilizing, and characterizing thallophytes, and other varieties of non-flowering plants.					
C5		To compare the structural diversity of fossil and extant plant species.					
UNIT	EXPERIMENTS						
I	ALGAE Study of algae in the field and laboratory of the genera included in theory. External morphology and internal anatomy of the vegetative and reproductive structures of the following living forms: <i>Oscillatoria</i> , <i>Caulerpa</i> , <i>Codium</i> , Diatoms, <i>Dictyota</i> and <i>Gelidium</i> (depending on availability of the specimen). To record the local algal flora—Study of their morphology and structure. Identification of algae to species level (at least One). Preparation of culture media and culture of green algae and blue green algae in the laboratory (Demonstration).						
	FUNGI Study of morphological and reproductive structures of the following living forms: <i>Phytophthora</i> , <i>Rhizopus</i> , <i>Taphrina</i> and <i>Polyporus</i> and <i>Collectotrichum</i> . (depending on availability of the specimen). Isolation and identification of fungi from soil, air, and Baiting method. Preparation of culture media. Cultivation of mushroom in the laboratory (Demonstration).						

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	LICHENS Study of morphological and reproductive structures of the genera <i>Parmelia</i> .	
III	BRYOPHYTES External morphology and internal anatomy of the vegetative and reproductive organs of the following living forms: <i>Targionia</i> , <i>Lunularia</i> , <i>Porella</i> and <i>Polytrichum</i> (depending on availability of the specimen).	
IV	PTERIDOPHYTES External morphology and internal anatomy of the vegetative and reproductive organs of the following living forms: <i>Azolla</i> , <i>Adiantum</i> , <i>Angiopteris</i> and <i>Pteris</i> (depending on availability of the specimen). Fossil slides observation: <i>Sphenophyllum</i> .	
V	GYMNOSPERMS External morphology and internal anatomy of the vegetative and reproductive organs of the following living forms: <i>Cupressus</i> , <i>Araucaria</i> , <i>Podocarpus</i> and <i>Ephedra</i> (depending on availability of the specimen). Fossil slides observation: <i>Cordaites</i> .	
Course outcomes: CO	On completion of this course the student will be able to	Programme outcomes
CO1	Recall and applying the basic keys to distinguish at species level identification of important algae and fungi through its structural organizations.	K1 & K4
CO2	Demonstrate practical skills in thallophytes, Pteridophytes and Gymnosperms.	K2
CO3	Describe the structure of algae, fungi, lichens, Bryophytes, Pteridophytes and Gymnosperms.	K3
CO4	Determine the importance of structural diversity in the evolution of plant forms.	K4
CO5	Formulate techniques to isolate and culture of alga and fungi as well as to understand the diversity of plant forms.	K5
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	
Extended Professional Component (is a part of internal component only, Not to be included in the	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)	

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External Examination question paper)	
Skills acquired from this course	Knowledge, Problem Solving, Analytical ability, Professional Competency, Professional Communication and Transferrable Skill
Recommended Text:	
<ol style="list-style-type: none"> 1. Kumar, H.D. 1999. Introductory Phycology. Affiliated East-West Press, Delhi. 2. Das, S and Saha, R. 2020. Microbiology Practical Manual. CBS Publishers and Distributors (P) Ltd., New Delhi, India. 3. Sharma, O.P. 2012. Pteridophyta, Tata McGraw-Hills Ltd, New Delhi. 4. Sharma O.P and S, Dixit. 2002. Gymnosperms. Pragati Prakashan. 5. Johri, R.M, Lata, S, Tyagi, K. 2005. A text book of Gymnosperms, Dominate pub and Distributer, New Delhi. 	
Reference Books:	
<ol style="list-style-type: none"> 1. Chmielewski, J.G and Kravesky, D. 2013. General Botany laboratory Manual. Author House, Bloomington, USA. 2. Webster, J and Weber, R. 2007. Introduction to Fungi, 3rd Ed. Cambridge University Press, Cambridge. 3. Sharma, O.P. 2017. Bryophyta, MacMillan India Ltd, New Delhi. 4. Ashok, M. Bendre and Kumar. 2010. A text book of Practical Botany, Algae, Fungi, Lichen, Bryophyta, Pteridophyta, Gymnosperms and Palaeobotany. Revised edition. Published by Rakesh Kumar Rastogi publication. 5. Gangulee, H.C and A.K. Kar. 2013. College Botany. Vth Edition. S. Chand. 	
Web resources:	
<ol style="list-style-type: none"> 1. https://www.frontiersin.org/articles/10.3389/fmicb.2017.00923/full 2. https://microbiologyonline.org/file/7926d7789d8a2f7b2075109f68c3175e.pdf 3. http://www.cuteri.eu/microbiologia/manuale_microbiologia_pratica.pdf 4. https://www.amazon.in/Manual-Practical-Bryophyta-Suresh-Kumar/dp/B0072GNFX4 5. https://www.amazon.in/Practical-Manual-Pteridophyta-Rajan-Sundara/dp/8126106883 6. https://www.google.co.in/books/edition/Gymnosperms/3YrT5E3Erm8C?hl=en&gbpv=1&dq=gy mnosperms&printsec=frontcover 7. https://www.amazon.in/Paleobotany-Biology-Evolution-Fossil-Plants/dp/0123739721 	

Mapping with Programme Outcomes:

COs	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	2	3	3	3	3	3	3	3	3	3
CO2	3	3	2	3	3	3	1	3	1	3
CO3	3	3	3	3	3	3	2	3	2	3
CO4	3	3	2	1	2	2	1	2	1	3
CO5	3	3	3	3	3	3	3	2	3	2

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