UNIVERSITY OF MADRAS

M.Sc. DEGREE PROGRAMME IN BOTANY

SYLLABUS WITH EFFECT FROM 2023-2024

Title of the Course		**PLANT DIVERSITY – I: ALGAE, FUNGI, LICHENS, BRYOPHYTES, BACTERIA AND VIRUSES**					
Paper Number		**CORE I**					
Category	Core	**Year**	I	**Credits**	5	**Course Code**	423C1A
		Semester	I				
Instructional Hours per week		**Lecture**	**Tutorial**	**Lab Practice**	**Total**		
		4	2	-	6		
Pre-requisite		Students should be familiar with the basics of algae, fungi, lichens and Bryophytes.					

Learning Objectives:

C1	To learn about the classification, distinguishing traits, geographic distribution, and reproductive cycle of algae, fungi, lichens, and bryophytes.
C2	To gain knowledge about the ecological and economic importance of algae, fungi, lichens and bryophytes.
C3	To spark interest in the evolutionary roots of plant development.
C4	To study the biodiversity by describing and explaining the morphology and reproductive processes of algae, fungi, bryophytes and microorganisms.
C5	To expose the beneficial and harmful viewpoint.

UNIT	**CONTENTS**
I	**ALGAE:** Classification of algae by F.E. Fritsch (1935-45). Salient features of major classes: Cyanophyceae, Chlorophyceae, Xanthophyceae, Chrysophyceae, Cryptophyceae, Dinophyceae, Chloromonadineae, Euglenophyceae, Charophyceae, Bacillariophyceae, Phaeophyceae and Rhodophyceae. Range of thallus organization, algae of diverse habitats, reproduction (vegetative, asexual and sexual) and life cycles. Structure, reproduction and life cycles of the following genera: *Oscillatoria*, *Caulerpa, Codium,* Diatoms, *Dictyota* and *Gelidium.* Economic importance of algae.
II	**FUNGI:** General Characteristics, occurrence and distribution. Contributions of Indian Mycologists (C.V.Subramanian). Classification of Fungi by Alexopoulos and Mims (1979). Heterothallism in fungi, sexuality in fungi, Para sexuality, sex hormones in fungi. Economic importance of fungi. Structure, reproduction and life cycles of the following genera: *Phytophthora, Rhizopus, Taphrina* and *Polyporus* and *Collectotrichum.*
III	**LICHENS:** Classification of lichens (Hale, 1969). Occurrence and inter-relationship of phycobionts and mycobionts. Structure and reproduction in Ascolichens, Basiodiolichens and Deuterolichens. Lichen –economic importance and as indicator pollution. Economic importance of lichens.

IV	**BRYOPHYTES:** General characters and Classification of Bryophytes by Watson (1971). Structural variations and evolution of gametophytes and sporophytes in Bryopsida, Anthoceropsida and Mosses. General characters of major groups - Marchantiales, Jungermaniales, Anthocerotales, Sphagnales, Funariales and Polytrichales. Structure, reproduction and life cycles of the following genera: *Targionia*, *Lunularia*, *Porella* and *Polytrichum.* Economic importance of Bryophytes.
V	**BACTERIA AND VIRUSES** Structure and reproduction of bacteria, Mycoplasma, Virology –Classification of plant viruses, general characters, structure and reproduction. Important plant diseases caused by bacteria (Blight of Paddy) and virus (Bunchy top of Banana), and Mycoplasma (Phyllody of Sesamum).

Course outcomes: CO	**On completion of this course, the students will be able to:**	**Programme outcomes**
CO1	Relate to the structural organizations of algae, fungi, lichens and Bryophytes.	K1
CO2	Demonstrate both the theoretical and practical knowledge in understanding the diversity of basic life forms and their importance.	K2
CO3	Explain life cycle patterns in algae, fungi, lichens and Bryophytes.	K3
CO4	Knowledge on the beneficial and harmful microbes to create general awareness.	K4
CO5	Discuss and develop skills for effective conservation and utilization of lower 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

Recommended texts:

1. Kumar, H.D.1999. Introductory Phycology. Affiliated East-West Press, Delhi.
2. Barsanti, L. and Guadtieri, P. 2014. Algae: Anatomy, Biochemistry and Biotechnology, 2nd Edition, CRC Press, ISBN: 1439867321.
3. Sharma, O.P. 2011. Fungi and Allied Microorganisms, Mc Graw Hill, ISBN:9780070700383, 0070700389
4. Kevin K. 2018. Fungi biology and Application, 3rd Edition, Wiley Blackwell.
5. Pandey, P.B. 2014. College Botany-1: Including Algae, Fungi, Lichens, Bacteria, Viruses, Plant Pathology, Industrial Microbiology and Bryophyta. Chand Publishing, New Delhi.

6. Singh, Pandey and Jain. 2020. A text book of Botany, 5th Edition, Rastogi Publication, Meerut.
7. Webster, J and Weber, R. 2007. Introduction to Fungi, Cambridge University Press,Cambridge. 3rd edition.
8. Muthukumar, S and Tarar, J.L. 2006. Lichen Flora of Central India, Eastern book Corporation, New Delhi.
9. Singh, Pandey and Jain. 2020. A text book of Botany, 5th Edition, Rastogi Publication, Meerut.
10. Sharma, O.P. 2017. Bryophyta, MacMillan India Ltd. Delhi.

Reference Books:

1. Sundaralingam, V. 1991. Marine algae. Bishen Singh and Mahendra Pal Singh Publishers, Dehradun.
2. Edwardlee,R. 2018. Phycology, 5thEd., Cambridge UniversityPress, London.
3. Nash, T.H. 2008. Lichen Biology, Cambridge University press.
4. Johri, R.M., Lata, S. and Tyagi, K. 2012. A Textbook of Bryophyta. Dominant Publishers & Distributors Pvt., Ltd., New Delhi. ISBN: 9789384207335.
5. Alexopoulos, C.J. and Mims, M. 2007. Introductory Mycology. 4th Edition, Wiley Publishers, ISBN: 9780471522294

Web resources:

1. https://www.britannica.com/science/algae
2. https://en.wikipedia.org/wiki/Bryophyte
3. https://www.britannica.com/plant/bryophyte/Ecology-and-habits
4. https://www.livescience.com/53618-fungus.html.
5. http://www.uobabylon.edu.iq/eprints/paper_11_20160_754.pdf
6. https://www.youtube.com/watch?v=vcYPI6y-Udo
7. https://www.youtube.com/watch?v=XQ_ZY57MY64
8. http://www-plb.ucdavis.edu/courses/bis/1c/text/Chapter22nf.pdf

Mapping with Programme Outcomes:

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

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