University of Kerala

Discipline	BOTANY				
Course Code	UK4DSCBOT203				
Course Title	**Diversity of Lower Plants**				
Type of Course	DSC				
Semester	IV				
Academic Level	200 - 299				
Course Details	Credit	Lecture per week	Tutorial per week	Practical per week	Total Hours/Week
	4	3 hours	-	2 hours	5 hours
Pre-requisites	UK3DSCBOT200				
Course Summary	To familiarize the students with microbes and cryptogams. Students need to know about their structure, life cycle, and utilization. The course will give an insight into the diversity of microbes and cryptogams, their diagnostic features, and their economic and ecological significance, and their applications.				

Detailed Syllabus:

Module	Unit	Content	Hrs
I		**PHYCOLOGY**	**10**
	1	General characteristics, Fritsch (1935) system of classification; range of thallus organization; Significant contributions of eminent phycologists (F.E. Fritsch, H.D.Kumar, and M.O.P. Iyengar)- brief account only.	2
	2	Study of morphology, reproduction, and life cycle of *Oscillatoria*, *Volvox*, *Oedogonium, Chara*, *Vaucheria*, *Sargassum*, and *Polysiphonia,*	7
	3	Ecological and Economic Importance of Algae: Algal blooms; algae as sources of phycocolloids (Agar-agar, Alginic acid, Carrageenin), algae as food, algae as medicine, role of diatomaceous earth in industry, algae as a source of biofuels.- brief account only	1
II		**MYCOLOGY**	**9**
	1	General characteristics, thallus and modifications; cell wall composition; nutrition in fungi (saprophytes, parasites, predators, symbionts); reproduction (vegetative, asexual, and sexual), classification (Ainsworth, 1973)-brief account only.	3

	2	The thallus, reproductive structures, and life cycle(in brief) of the genera mentioned in each group: *Phytophthora* (Oomycota), *Penicillium* (Ascomycota), *Agaricus* (Basidiomycota), and *Cercospora* (Deuteromycota).	6
III	**LICHENOLOGY**		**4**
		Introduction, occurrence, general characteristics, classification, Anatomy, Nutrition, and Reproduction- Thallus structure and reproduction of *Usnea*.	3
		Ecological and economic importance	1
IV	**PLANT PATHOLOGY**		**7**
	1	Introduction, classification, general symptoms, stages in the development of disease, and various control measures; – Host-parasite interaction, disease triangle, phytoalexins. -brief account only.	3
	2	Study of the following diseases with emphasis on symptoms, disease cycle, and control measures - Leaf mosaic of Tapioca, Citrus Canker, Powdery mildew of Rubber.	3
	3	Brief account of the following fungicides- Bordeaux mixture, Lime sulphur, Tobacco decoction, Neem cake & oil.	1
V		**MICROBIOLOGY**	**15**
	1	History –Contributions of Robert Hook, Antony van Leeuwenhoek, Louis Pasteur, Robert Koch.	2
	2	Bacterial: Morphology and classification, Gram staining: Ultrastructure of bacteria, Reproduction, Economic importance. Mycoplasma &Actinomycetes – General account.	4
	3	Virus-Structure and reproduction in general, Bacteriophages- Structure and reproduction (Lytic and Lysogenic cycle), Beneficial and harmful activities of viruses	4
	4	Applied microbiology -Nitrogen fixation, Bio-fertilizers, Pasteurization, types (canning, drying), single cell protein, edible mushrooms, soil microorganisms – bacteria (cyanobacteria and actinobacteria), algae, fungi, and viruses –Role of microbes in soil fertility- rhizosphere and Phyllosphere.	5
		PRACTICALS	**30**
		• Gram staining of bacteria. • Make micro preparations of vegetative and reproductive structures of the algal and fungal types mentioned in the syllabus. • Identify the algal specimens mentioned in the syllabus and make labelled sketches of the specimens observed • Identification of Different Types of Lichens. • Identify the Diseases mentioned with respect to the causal organism and symptoms of Leaf Mosaic of Tapioca, Citrus Canker, and Powdery Mildew of Rubber	

		• Prepare the fungicides- Bordeaux mixture &Tobacco decoction • Collection and identification of Algae and fungi from the campus	

REFERENCE BOOKS

1. Prescott, L.M., Harley J.P., Klein D. A. (2010). Microbiology, McGraw-Hill, India. 8th edition.
2.Pelczar et al. (2011) Microbiology, 8th edition, Tata McGraw-Hill Co, New Delhi.
3. Sethi, I.K. and Walia, S.K. (2011). Textbook of Fungi and Their Allies, Macmillan Publishers India Ltd
4. Campbell, R., 1987. Plant Microbiology. ELBS Edward Arnold, London
5. Willey, Sherwood, and Christopher. Laboratory exercises in Microbiology. McGraw-Hill, India. 9th edition.
6. Agrios, G.N., 2005. Plant pathology. Elsevier.
7.P. R. Vasista (2017). Botany for Degree students, Algae, S. Chand Publication, New Delhi
8. Vasishta, B.R., Sinha, A. K., and Kumar, A., 2016. Botany for Degree Students, Fungi. S. Chand and Company Ltd, New Delhi.
9. Gupta, V. K. and Paul, T. S., 2004, Fungi & Plant Diseases. Kalyani Publishers, New Delhi
10. Misra A and Agrawa P.R. 1978. Lichens, New Delhi: Oxford and IBH.
11. Nita Bahl 2002. Handbook on Mushrooms, Oxford & IBH Publishing. Pvt. Ltd. New Delhi.
12. Sharma, P. D., 2004, The Fungi, 2nd Edition, Rasthogi Publication.
13. Cryptogamic Botany. Vol. 1 & 2. Smith, G. M. 1972. Tata McGraw-Hill Publishing Co. Ltd.
14. Botany Vol. I & II Das, Dutta, Gangulee, and Kar, New Central Book Agency,
15. A Textbook of Botany, vol. I and II S.N. Pandey, P. S. Trivedi and S. P. Misra., Vikas Publication House Pvt. Ltd Collage

Course Outcomes

No.	Upon completion of the course the graduate will be able to	Cognitive Level	PSO addressed

CO-1	The students will have an overview and analyze the structure and relationship of various forms of cryptogams.	R, U	PSO-1,2
CO-2	Understanding the scope and contributions of Scientists to Botany	R, U	PSO-1,2
CO-3	Analyse the ecological and economic roles of microbes, algae, fungi, and lichens in various ecosystems.	An, E	PSO-1,3
CO-4	Apply knowledge of plant pathology to diagnose, prevent, and mitigate plant diseases in agricultural, horticultural, and natural ecosystems	Ap, C	PSO-1,6
CO-5	Emphasizes the applications of microbiology to address environmental problems and provide microbial remedial measures	Ap, C	PSO-3,6

R-Remember, U-Understand, Ap-Apply, An-Analyse, E-Evaluate, C-Create

Name of the Course: Credits: 4:0:0 (Lecture:Tutorial:Practical)

CO No.	CO	PO/PSO	Cognitive Level	Knowledge Category	Lecture (L)/Tutorial (T)	Practical (P)
1	1	1,2	R, U	F	L	P
2	2	1,2	R, U	F, C	L	P
3	3	1,3	An, E	F, C	L	P
4	4	1,6	Ap, C	P	L	P
5	5	3,6	Ap, C	P,M	L	P

F-Factual, C- Conceptual, P-Procedural, M-Metacognitive

Assessment Rubrics:

- Quiz / Assignment/ Quiz/ Discussion / Seminar
- Midterm Exam
- Programming Assignments
- Final Exam

Mapping of COs to Assessment Rubrics :

	Internal Exam	Assignment	Project Evaluation	End Semester Examinations
CO 1	✓	✓		✓
CO 2	✓	✓		✓
CO 3	✓			✓
CO 4	✓	✓	✓	✓
CO 5	✓		✓	