DEPARTMENT OF BOTANY				*CLASS: I M.Sc. Botany*				
Sem	**Course Type**	**Course Code**	**Course Title**	**Credits**	**Contact Hours/week**	**CIA**	**Ext**	**Total**
I	Major Core 1	21P1BMC1	Plant diversity – I	4	5	25	75	100

Nature of Course				
Knowledge and skill	✓		Employability oriented	✓
Skill oriented	✓		Entrepreneurship oriented	✓

Course Objectives

1. To gain knowledge on the characteristic features, classification and distribution of algae, fungi, lichens and bryophytes.
2. To understand the methods of reproduction and life cycle of algae, fungi, lichens and bryophytes.
3. To enumerate the ecological and economic importance of algae, fungi, lichens and bryophytes.

UNIT	CONTENT	CLO	K LEVEL	HOURS
1	Algae: Introduction; criteria for algal classification; classification by Fritch; Algal habitats - freshwater algae, marine algae, soil algae, symbiotic algae and parasitic algae. ultra structure of prokaryotic and eukaryotic algal cells and their components - cell wall, protoplasm, eye spots, chloroplast, pyrenoid, nucleus. origin and evolution of sex in algae	**1**	**Up to K4**	**15**
2	Thallus organization, pigmentation, reserve food material, flagellation- life cycle patterns and phylogeny for the following major classes: Cyanophyceae, Chlorophyceae, Xanthophyceae, Bacillariophyceae, Phaeophyceae and Rhodophyceae., fossil algae. economic importance of algae: food and feed - single cell protein - industrial products (Agar-Agar, carrageenan, alginic acid, vitamins and biofuel) – medicinal values and Diatomaceous earth. algal cultivation methods.	**2**	**Up to K4**	**15**
3	Fungi: General features; occurrence and distribution; mode of nutrition in fungi; culture of fungi. classification of fungi by Alexopoulos and Mims, 1979; general characters of major classes: Mastigomycotina, Zygomycotina, Ascomycotina, Basidiomycotina and Deuteromycotina. Phylogeny and interrelationships of major groups of fungi. homothallism and heterothallism. homokaryon and heterokaryon. reproduction, life cycle types, parasexual cycles.	**3**	**Up to K4**	**15**

4	Mycelial modifications; fruiting bodies- spore dispersal mechanism- physiological specialization and degeneration of sex in fungi. Economic importance of fungi; as medicines and in industries. Lichens: Introduction – classification of lichens – distribution – interrelationship – phycobionts – mycobionts – thallus organization – vegetative propagules- reproduction – lichens as indicator of pollution – economic importance of lichens.	**4**	**Up to K4**	**15**
5	Bryophytes: General features, distribution, classification (Watson, 1971), general characters of major classes. Hepaticopsida, Anthocerotopsida and Bryopsida. range of vegetative structure, evolution of gametophytes and sporophytes. Reproduction – Vegetative, asexual and sexual, spore dispersal mechanisms in bryophytes; ecological and economic importance of bryophytes. Origin and interrelationships, Fossil bryophytes.	**5**	**Up to K4**	**15**

Books for study

1. Alexopoulos, C. J. (1996) Introductory Mycology. Wiley Publishers, ISBN: 9780471522294.
2. Cooke, M. C. (2017) Fungi: Their Nature and Uses. Historical Books Ltd., London, ISBN: 978-1545335581
3. Bilgrami, K. S. (2010) A Textbook of Algae. CBS Publisher & Distributors, New Delhi, ISBN: 978-8123900490
4. Edwardlee, R. (2008) Phycology, 4th Edition, Cambridge University Press, London, ISBN: 0521682770.
5. Barsanti, L. and Guadtieri, P. (2014) Algae: Anatomy, Biochemistry and Biotechnology, 2nd Edition, CRC Press, ISBN: 1439867321.

Books for references:

1. Ahmadjian, V. and Hale, M. E. (1973) The Lichens. Springer Verlag, Berlin. ISBN: 978-0-12-044950-7
2. Johri, R. M., Lata, S. and Tyagi, K. (2012). A Textbook of Bryophyta. Dominant Publishers & Distributors Pvt., Ltd., New Delhi. ISBN: 9789384207335.
3. Suresh Kumar (2014) Textbook of Bryophyta. K.K. Publication, New Delhi, ISBN: 978-8184115093
4. Stephenson, S. L. (2010) The Kingdom Fungi: An Introduction to Mushrooms, Molds and Lichens, 1st Edition, Timber Press, ISBN: 0881928917.
5. Schofield, W. B. (2001) Introduction to Bryology, 1st Edition, The Blackburn Press, ISBN: 1930665261.

Web Resources:

1. https://www.easybiologyclass.com/?s=algae
2. https://www.britannica.com/search?query=fungi
3. https://www.britannica.com/science/lichen

Rationale for Nature of the Course:

Demonstration and field visit to areas of mass cultivation of algae and fungi of nutritional, pharmaceutical, industrial and ecosystem restoration interests.

Activities having direct bearing on Skill development / Employability / Entrepreneurship
Observation of morphology and scientific identification of species of the respective plant divisions
Analyzing the ecological and economic significance of algae, fungi, lichens and bryophytes

Pedagogy:
Chalk and Talk, PPT, Group Discussion, Seminar, Interaction, Problem Solving, Quiz, Virtual Labs & Learning Management System (CANVAS).
Documenting the ecological and utility aspects of lichens and bryophytes

CLOs	CLO Statement	Knowledge Level
Students will be able to know, understand, apply and analyse		
CLO -1	the vegetative and reproductive morphology; classification and phylogeny of lower algae	Up to K4
CLO -2	the ecology, exclusive cellular components and economic importance of algae	Up to K4
CLO -3	the general characters, culture methods, classification, phylogeny and economic importance of fungi	Up to K4
CLO -4	the some special considerations of fungi and thallus organizations, reproduction and economic importance of lichens	Up to K4
CLO -5	the salient features, major classes, ecology and economic importance of bryophytes	Up to K4

Mapping Programme Specific Outcomes with Course Outcome:

	PSO-1	PSO-2	PSO-3	PSO-4	PSO-5
CLO-1	1	1	2	2	2
CLO-2	2	2	2	3	2
CLO-3	2	3	3	2	3
CLO-4	3	3	3	3	3
CLO-5	3	3	3	2	3

3-Advance application, 2- Intermediate level, 1- Basic level

Lesson Plan

Unit	Description	Hrs	Mode
I	a) Introduction to algae	2	Chalk and talk PPT, LMS and Group discussion
	b) Classification classification by Fritch	2	
	c) Thallus organization, pigmentation	3	
	d) Reserve food material, flagellation	2	
	e) Life cycle patterns and phylogeny for the Cyanophyceae, Chlorophyceae	2	
	f) Xanthophyceae, Bacillariophyceae	2	
	g) Phaeophyceae and Rhodophyceae.	2	
II	a) Algal habitats - freshwater algae, marine algae, soil algae, symbiotic algae and parasitic algae.	5	Chalk and talk PPT, LMS Quiz, Video lectures and Group discussion
	b) Ultra structure of prokaryotic and eukaryotic algal cells and their components - cell wall, protoplasm, eye spots, chloroplast, pyrenoid, nucleus.	3	
	c) Origin and evolution of sex in algae, fossil algae. economic importance of algae: food and feed - single cell protein - industrial products (Agar-Agar, carrageenan, alginic acid, vitamins and biofuel)- medicinal values and Diatomaceous earth.	5	
	d) Algal cultivation methods.	2	
III	a) General features; occurrence and distribution mode of nutrition in fungi	2	Chalk and talk PPT, LMS Quiz, Video lectures and Group discussion
	b) Culture of fungi. classification of fungi by Alexopoulos and Mims, 1979;	3	
	c) General characters of major classes: Mastigomycotina, Zygomycotina, Ascomycotina, Basidiomycotina and Deuteromycotina.	2	
	d) Phylogeny and interrelationships of major groups of fungi.	2	
	e) Homothallism and heterothallism. homokaryon and heterokaryon.	3	
	f) Reproduction, life cycle types, parasexual cycles. economic importance of fungi; as medicines and in industries.	3	
IV	a) Mycelial modifications; fruiting bodies	2	Chalk and talk PPT, LMS Quiz, Video lectures and Group discussion
	b)Spore dispersal mechanism- physiological specialization and degeneration of sex in fungi.	2	
	c) Lichens: Introduction- classification of lichens	2	
	d)Distribution – interrelationship- phycobionts – mycobionts	2	
	e) Thallus organization –vegetative propagules	2	
	f) Reproduction – lichens as indicator of pollution	3	
	g) Economic importance of lichens.	2	

V	a) Bryophytes: General features, distribution b) Classification of Bryophytes (Watson, 1971) c) general characters of major classes. Hepaticopsida, Anthocerotopsida and Bryopsida. d) Range of vegetative structure, evolution of gametophytes and sporophytes. e) Reproduction – Vegetative, asexual and sexual, f) Spore dispersal mechanisms in bryophytes g) Ecological and economic importance of bryophytes h) Origin and interrelationships, Fossil bryophytes.	1 1 2 3 3 3 2	Chalk and talk PPT, LMS Quiz, Video lectures and Group discussion

Course Designer: **Prof. S. Chella Pandian, Associate Professor**

PG Botany Blue Print

Test	10 marks	As per table below
Assignment	5 marks	K4
Seminar	5 marks	K4
Quiz	5 marks	K4

Learning Outcome Based Education (LOBE) & Assessment
Formative – Blue Print
Articulation Mapping-K Levels with Courses Learning Outcomes (CLOs)

Units	**CLOs**	**K- Level**	**Section A**		**Section B (Either/or Choice)**	**Section C (Open Choice)**
			Short Answers			
			No. of Questions	**K- Level**		
1	CLO x	Up to K3	2	K2,K3	2 (K3&K3)	2 (K2,K3)
2	CLO y	Up to K4	3	K2, K2, K3	2 (K4&K4)	1 (K3/K4)
No. of Questions to be asked			5		4	3
No. of Questions to be answered			5		2	2
Marks for each question			2		5	10
Total Marks for each section			10		10	20

Learning Outcome Based Education (LOBE) & Assessment
Summative Examination – Blue Print
Articulation Mapping-K Levels with Courses Learning Outcomes (CLOs)

Units	CLOs	K- Level	Section A		Section B		Section C (Either/or Choice)	Section D (Open Choice)
			MCQs		Short Answers			
			No. of Questions	K- Level	No. of Questions	K- Level		
1	CLO 1	Up to K2	2	K1 & K1	1	K1	2 (K1&K1)	1 (K2)
2	CLO 2	Up to K3	2	K2 & K3	1	K1	2 (K2&K2)	1 (K3)
3	CLO 3	Up to K4	2	K2 & K3	1	K2	2 (K3&K3)	1 (K3)
4	CLO 4	Up to K4	2	K3 & K4	1	K2	2 (K4&K4)	1 (K4)
5	CLO 5	Up to K4	2	K3 & K4	1	K3	2 (K4&K4)	1 (K4)
No. of Questions to be asked			10			5	10	5
No. of Questions to be answered			10			5	5	3
Marks for each question			1			2	5	10
Total Marks for each section			10			10	25	30

Distribution of Section- wise marks with K Levels in the summative examinations

K Levels	Section A (No Choice)	Section B (No Choice)	Section C (Either/or)	Section D (Open Choice)	Total Marks	% of Marks without choice	Consolidated
K1	2	4	10	-	**16**	13.33	**35%**
K2	2	4	10	10	**26**	21.66	
K3	4	2	10	20	**36**	30.00	**30%**
K4	2	-	20	20	**42**	35.00	**35%**
Total Marks	10	10	50	50	**120**	100.00	**100%**