PL18C01	Microbiology & Plant diversity I (Bacteria, Virus, Applied Microbiology, Algae, Fungi, Lichens and Plant Pathology)	Category	L	T	P	Credit
		CORE	86	4	-	6

Preamble

- To study the characteristics and life cycle of Bacteria, Virus, Algae, Fungi and Lichens.
- To study various plant diseases and their control measures.

Course outcomes

On the successful completion of the course, students will be able to:

CO Number	CO Statement	Knowledge Level
CO1.	Classify the microbes	K1
CO2.	Understand the characteristics of Bacteria, Virus, Algae, Fungi and Lichens	K2
CO3.	Know the life cycle of Bacteria, Virus, Algae, Fungi and Lichens	K2
CO4.	Identify the causes, symptoms and control measures of plant diseases	K2
CO5.	Differentiate the association between microbes and with plants	K3

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4
CO1.	S	S	S	S
CO2.	S	S	S	M
CO3.	M	S	M	S
CO4.	S	M	S	M
CO5.	S	M	M	S

S- Strong; M-Medium

Syllabus

Unit-I Bacteria and Virus **17hrs**

History and scope of microbiology. Classification, Morphology, microbial growth, nutrition and reproduction of bacteria. Viruses – structure, classification and reproduction. A general account on Mycoplasmas.

Unit-II Applied Microbiology **17hrs**

Methods of sterilization, Culture media- PDA and Nutrient Agar and Broth media, Pure culture techniques, Staining of bacteria-Gram staining. Study of bacterial growth – enumeration of cell numbers, determination of viable count. Growth curve of bacteria.

Unit-III Algae **18hrs**

General characteristics of algae, Classification (Fritsch, 1935). A detailed study of the structure, reproduction and life cycle of *Chlamydomonas,* Diatoms*, Dictyota*, *Polysiphonia* and *Anabaena.* Economic importance of Algae.

Unit-IV Fungi and Lichens **17hrs**

General characteristics of Fungi. Classification (Alexopoulos and Mims, 1972). Detailed study of morphology and reproduction of *Plasmodiophora, Albugo, Aspergillus, Puccinia* and *Fusarium*. Economic importance of Fungi.

Lichens: General characteristics, classification (Alexopolus and Mims, 1979), reproduction and economic importance of Lichens. Detailed study of *Usnea*.

Unit-V Plant Pathology **17hrs**

Classification of diseases – general symptoms. Penetration and disease development. Morphological and biochemical defense mechanisms in plants. A detailed study of the following plant diseases – Mosaic disease of tobacco, Citrus canker, Late blight of Potato, Red rot of sugarcane, Tikka disease of groundnut (causal organisms, symptoms, disease cycle and control measures).

Text Books

S.No.	Author name	Year of publication	Title of the book	Publishers name
1.	Pandey, B.P	2003	College Botany Vol II	S Chand & Company, New Delhi.
2.	Vasishta BR & Sinha AK	2003	Botany for degree students Fungi	S. Chand and Company Ltd., New Delhi
3.	Purohit, S.S	2008	Microbiology-Fundamentals & Applications	Rastogi Publications, Meerut
4.	Vashishta, B.R., Sinha, A.E and Singh, V.P	2013	Algae	S Chand and Company Ltd., New Delhi

Reference Books

S.No.	Author name	Year of publication	Title of the book	Publishers name
1.	Gangulee, HC. & Kar, AK	1989	College Botany, Vol-II	Books & Allied Pvt. Ltd. Calcutta.
2.	Mehrotra, RS & Aneja, KR	1999	An introduction to Mycology, 2nd Ed	New Age International Publishers, New Delhi
3.	Alexopoulos, CJ.	1996	Introduction to Mycology	John Wiley & Sons, New York

Pedagogy*: *E-content , Lecture, Power point presentation, Seminar, Assignment, Quiz, Group Discussion,Video / Animation

Course Designers

Dr. B. Chitra Devi
Dr. R. Sumathi

PL17C02	Plant Diversity II (Bryophytes, Pteridophytes, Gymnosperms, and Palaeobotany)	Category	L	T	P	Credit
		CORE	71	4	-	5

Preamble

- To study the classification, characteristics and life cycle of Bryophytes, Pteridophytes and Gymnosperms
- To study the process of fossilization, geo-chronology and radio-carbon dating

Course outcomes

On the successful completion of the course, students will be able to:

CO Number	CO Statement	Knowledge Level
CO1.	Classify Bryophytes, understand its lifecycle	K2
CO2.	Understand the characteristics of Pteridophytes and their classification	K2
CO3.	Assess the evolutionary features in Pteridophytes	K3
CO4.	Understand the characteristics of Gymnosperms and their classification	K2
CO5.	Interpret the evolutionary sequence with the knowledge of the geological time scale	K3

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4
CO1.	S	S	S	M
CO2.	S	S	S	M
CO3.	S	S	M	M
CO4.	S	S	M	M
CO5.	S	S	S	S

S- Strong; M-Medium

Syllabus

Unit I - Bryophytes **14hrs**

Classification of Bryophytes (Reimers-1954). General characteristics of the classes and a detailed study of the genera specified: Hepaticopsida (*Marchantia*); Anthocerotopsida (*Anthoceros*); Bryopsida (*Sphagnum*). *Economic importance of bryophytes.

Unit II - Pteridophytes **14hrs**

Classification (Sporne, 1975). General characteristics of the major sub-divisions and a detailed study of the genera specified: Psilotopsida (*Psilotum*); Lycopsida (*Lycopodium*). Stelar Evolution.

Unit III – Pteridophytes (Contd..) **14hrs**

General characteristics of the major sub-divisions and a detailed study of the genera specified: Sphenopsida (*Equisetum*); Pteropsida (*Marsilea*). Homospory, heterospory and seed habit. Economic importance of pteridophytes.

Unit IV- Gymnosperms **14hrs**

Classification (Coulter and Chamberlain, 1935). Salient features of the classes and a detailed study of the genera specified: Cycadopsida (*Cycas*); Coniferopsida (*Pinus*) and Gnetopsida (*Gnetum*). Economic importance of Gymnosperms.

Unit V- Palaeobotany **15hrs**

Geological time scale. Types of fossils: (compression, impression, petrifaction, coal balls. A detailed study of external and internal morphology and reproduction in *Rhynia*, *Lepidodendron* and *Calamites*.

Text Books

S.No.	Author name	Year of publication	Title of the book	Publishers name
1.	Pandey, B.P	2003	College Botany Vol II	S Chand & Company, New Delhi
2.	Vasishta PC, Sinha AK &Anilkumar	2005	Botany for degree students	S Chand And Company Ltd., New Delhi.
3.	Vasishta.B.R, Sinha,&Adarsh Kumar,	2012	Botany for Degree students –Bryophyta	S Chand And Company Ltd., New Delhi.

Reference Books

S.No.	Author name	Year of publication	Title of the book	Publishers name
1.	Sporne, KR	1974	The Morphology of Gymnosperms	Hutchinson & Co., London.
2.	Steward. N. Wilson & Rothwell, W. Gar	2005	Paleobotany and evolution of Plants	Cambridge University Press
3.	Arnold. C. A	2013	An Introduction to Palaeobotany	McGraw Hill Book company, London.
4.	Sporne, KR	2015	The Morphology of Pteridophytes	Hutchinson & Co., London

Pedagogy:E-content , Lecture, Power point presentation, Seminar, Assignment, Quiz, Group Discussion, Video / Animation

Course Designers

Dr. B. Chitra Devi
Dr. R. Sumathi

PL17CP1	Core Practical – I Theory Paper - I (Microbiology & Plant diversity I & II)	Category	L	T	P	Credit
		CORE	-	-	90	3

Preamble

- To observe, characterize and identify the different types of Algae, Fungi, Lichens, Bryophytes, Pteridophytes, Gymnosperms and fossilized plants.
- To identify and differentiate the various plant diseases and the causative organisms.
- To isolate microorganisms from soil and establish pure cultures
- To distinguish between Gram positive and Gram negative bacteria
- To understand the process of fermentation

Course outcomes

On the successful completion of the course, students will be able to:

CO Number	CO Statement	Knowledge Level
CO1.	Remember and differentiate the different forms of algae, fungi, lichens, Lichens, Bryophytes, Pteridophytes, Gymnosperms and fossilized plants.	K1
CO2.	Understand the host – pathogen interactions	K2
CO3.	Prepare sterile microbial culture media and demonstrate pure culture techniques	K3
CO4.	Interpret the industrial impact of fermentation process	K3

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4
CO1.	S	S	M	M
CO2.	S	S	M	M
CO3.	S	S	M	M
CO4.	S	S	M	M

S- Strong; M-Medium

Syllabus

Semester I **30 hrs**

Algae -*Chlamydomonas,* diatoms*, Dictyota*, *Polysiphonia* and *Anabaena.*

Fungi **-** *Plasmodiophora, Albugo, Aspergillus, Puccinia* and *Fusarium*.

Lichens **-***Usnea*

Plant pathology- Mosaic disease of tobacco, Citrus canker, Late blight of potato, Red rot of sugarcane, Tikka disease of groundnut.

Microbial Techniques

Preparation of culture media: Nutrient broth and Nutrient Agar medium

Potato Dextrose Agar Medium

Preparation of slants

Soil dilution, Plating techniques, Enumeration of bacteria and fungi.

Microscopic observation of fungi – Lactophenol cotton blue staining,

Microscopic observation of bacteria – Gram staining

Fermentation using yeast

Semester II **30hrs**

Study of the following types

Bryophyta- *Marchantia, Anthoceros* and *Sphagnum*.

Pteridophyta-*Psilotum, Lycopodium, Equisetum* and *Marsilea*

Gymnosperms – *Cycas, Pinus* and *Gnetum*

Palaeobotany -*Rhynia, Lepidodendron* and *Calamites*

Course Designers

Dr. M. Kamalam
Dr. K. S. Tamil Selvi
Dr. B. Chitra Devi
Dr. E. Uma

UG

Bloom's Category	Section	Marks		Total
Remember (K_1)	A – 12 out of 15x2 marks	24	1 or 2 sentences	100
Understand (K_2)	B- 6 out of 8x6 marks	36	250 words	
Apply, Analyse (K_3, K_4)	C – 4 out of 6x 10 marks	40	500 words	

Question paper pattern for ALC-

CA

Bloom's Category	Section	Marks		Total
K_3, K_4	A – 4 out of 6 x 4 marks	16	250 words	25
K_4, K_5	B – 1 out of 2 x 9 marks	9	500 words	

Model and End Semester Examination

Bloom's Category	Section	Marks		Total
K_3, K_4	A – 5 out of 8 x 5 marks (Open Choice)	25	250 words	75
K_4, K_5	B – 5 out of 8 x 10 marks (Open Choice)	50	500 words	

Components of Continuous Assessment –

CA test	– 10 marks
Model Exam	– 15 marks
Total	**= 25 marks**