PSGR
Krishnammal College for Women

College of Excellence, nirf 2024-7th Rank
Autonomous and Affiliated to Bharathiar University
Reaccredited with A++ grade by NAAC, An ISO 9001:2015 Certified Institution
Peelamedu, Coimbatore-641004

DEPARTMENT OF BOTANY

CHOICE BASED CREDIT SYSTEM (CBCS) & LEARNING OUTCOMES- BASED CURRICULAR FRAMEWORK (LOCF)

(Semester– I&II)

BACHELOR OF BOTANY
(2024 – 2027 Batch)

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CHOICE BASED CREDIT SYSTEM (CBCS) & LEARNING OUTCOMES- BASED CURRICULAR FRAMEWORK (LOCF)

BACHELOR OF BOTANY (2024-2027 Batch)
SYLLABUS & SCHEME OF EXAMINATION
Applicable to students admitted during the academic year 2024 – 2025 onwards (I&II Sem)

Programme Learning Outcomes (PLO's)

Courses within the Botany curriculum will address goals and objectives at the appropriate level through measurable student learning outcomes developed by course instructors

PLO 1: Students will be able to remember, comprehend, apply, analyze and synthesize the core concepts in Botany, like evolution, biodiversity, structure and function, information flow, exchange and storage, pathways and transformations of energy and matter.
PLO 2: Students will develop the ability to apply and understand the defining characteristics of various processes of science and its uncertainty.
PLO 3: Students will also develop the ability to practice the skills of the scientific method. Engage in research projects and apply the quantitative skills to biological problems.
PLO 4: Students will be able to communicate and collaborate within and outside of biology and tap into the interdisciplinary nature of science.
PLO 5: Students will understand the relationship between science and society and to evaluate the impact of science as well as ethical implications of science in the society.

Programme Specific Objectives (PSO's)

At the end of the programme the student will

PSO1: Obtain strong foundation in classical botany, interdisciplinary subjects such as Bioinformatics, Biostatistics, and advance topics in Cell and Molecular biology, Biochemistry and Plant Biotechnology.
PSO2: Build capacity in Horticulture and production of cut flowers from the skill based courses offered.
PSO3: Carry out individual short-term internship and project work to acquire knowledge on research using basic and advanced instruments/equipments.
PSO4: Find opportunities for higher studies in top ranking universities.
PSO5: Gain career in teaching/research in Botany.

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Applicable to students admitted during the academic year 2024 – 2025 onwards (I&II Sem)

Sem	Part	Subject Code	Title of the Paper	Course Type	Instruction hours/week	Contact hours	Tutorial	Duration of Examination	Examination Marks			Credits
									CA	ESE	TOTAL	
I	I	TAM2301/ HIN2301/ FRE2301	Language I Tamil Paper I/ Hindi Paper I/ French Paper I	L	6	88	2	3	25	75	100	3
	II	ENG2301	English Paper I	E	6	88	2	3	25		100	3
	III	PL24C01	Microbiology & Plant Diversity I	CC	6	88	2	3	25	75	100	5
	III	PL24CP1	Botany Practical – I	CC	3	45	-	-	-	-	-	-
	III	CE24A01/ PS24A01	Chemistry for Biologists / Physics Paper	GE	4	58	2	3	20	55	75€	4
	III	CE23AP1/ PS23AP1	Chemistry for Biologists Practicals/ Practical Chemistry	GE	3	45	-	-	-	-	-	-
	IV	**Non Tamil Students**										2
		NME23B1 / NME23A1	Basic Tamil I/ Advanced Tamil I	AEC	2	28	2	-	100	-	100	
		Students with Tamil as Language										
		NME23ES	Introduction to Entrepreneurship	AEC	2	30	-	-	100	-	100	
I-V	VI	24BONL1 24BONL2 24BONL3	Online Course 1 Online Course 2 Online Course 3	ACC	-	-	-	-	-	-	-	
I-V	VI	COM15SER	Community Services	-	-	-	-	-	-	-	-	Gr.

II	I	TAM2302/ HIN2302/ FRE2302	Tamil Paper II/ Hindi Paper II/ French Paper II	L	6	88	2	3	25	75	100	3
	II	ENG2302	English Paper II	E	5	73	2	3	25	75	100	3
	III	PL24C02	Plant Diversity II	CC	6	88	2	3	25	75	100	5
	III	PL24CP1	Botany Practical – I	CC	3	45	-	3	25	75	100	4
	III	CE24A02/ PS24A02	Chemistry for Biologists-II/ Physics Paper - II	GE	5	73	2	3	20	55	75€	4
	III	CE24AP1/ PS23AP1	Chemistry Practical for Biologists/ Physics Practical	GE	3	45	-	3	15	35	50#	2
	IV	NM24UHR	Universal Human Values and Human Rights	AECC	2	30	-	-	100	-	100	2
	IV	NME23B2/ NME23A2*	Basic Tamil II/ Advanced Tamil II	AEC	-	-	-	-	100	-	100	Gr.
I-II	VI	NM23GAW	General Awareness	AEC	SS	-	-	-	100	-	100	Gr.
I-IV	VI	COM15SER	Community Services 30 Hours	GC	-	-	-	-	-	-	-	-
I-V	VI	24BONL1 24BONL2 24BONL3	Online Course 1 Online Course 2 Online Course 3	ACC	-	-	-	-	-	-	-	-

L – Language **E – English**
CC – Core Course **GE – Generic Elective**
AEC – Ability Enhancement Course **ACC – Additional Credit Course**
AECC – Ability Enhancement CompulsoryCourses
CA – Continuous Assessment **ESE–End Semester Examination**
Gr. – Grade **GC – General Course**
€ – CA conducted for 25 and converted into 20, ESE conducted for 75 and converted into 55
#– Allied Practical CA & ESE will be evaluated for 25/75 converted into 15/35
*** After class hours**

CA Question Paper Pattern and distribution of marks

Language and English

Section A 5 x 1 (No choice) : 5 Marks
Section B 4 x 5 (4 out of 6) : 20 Marks (250 words)
Section C 2 x 10 (2 out of 3) : 20 Marks (500 words)
Total : 45 Marks

CA Question from each unit comprising of

One question with a weightage of 2 Marks :2 x 3 = 6
One question with a weightage of 5 Marks (Internal Choice at the same CLO level) :5 x 3 =15
One question with a weightage of 8 Marks (Internal Choice at the same CLO level) :8 x 3 =24
Total : 45 Marks

End Semester Examination – Question Paper Pattern and Distribution of Marks

Language and English

Section A 10 x 1 (10 out of 12) : 10 Marks
Section B 5 x 5 (5 out of 7) : 25 Marks (250 words)
Section A 4 x 10 (4 out of 6) : 40 Marks (600 - 700 words)
Total : 75 Marks

UG - Core and Allied courses:

ESE Question Paper Pattern: 5 x 15 = 75 Marks

Question from each unit comprising of

One question with a weightage of 2 Marks : 2 x 5=10
One question with a weightage of 5 Marks (Internal Choice at the same CLO level): 5 x 5 =25
One question with a weightage of 8 Marks (Internal Choice at the same CLO level): 8 x 5 =40

ESE Question Paper Pattern:(for Accounts Paper) 5 x 15 = 75 Marks

Question from each unit comprising of

One question with a weightage of 2 Marks : 2 x 5=10
One question with a weightage of 5 Marks : 5 x 5 =25
One question with a weightage of 8 Marks (Internal Choice at the same CLO level): 8 x 5 =40

Continuous Internal Assessment Pattern

Theory

I Year UG

CIA Test : 5 marks **(conducted for 45 marks after 50 days)**
Model Exam : 7 marks **(Conducted for 75 marks after 85 days (Each Unit 15 Marks))**
Seminar/Assignment/Quiz : 5 marks
Class Participation : 5 marks
Attendance : 3 marks
Total : 25 Marks

Practical

Lab Performance : 7 marks
Regularity : 5 marks
Model Exam : 10 marks
Attendance : 3 marks
Total : 25 marks

ESE Practical Pattern

The End Semester Examination will be conducted for a maximum of 75 marks respectively with a maximum 15 marks for the record and other submissions if any.

Part IV

Introduction to Entrepreneurship / Women Studies / Value education / Environmental Studies / Design Thinking

Quiz : 50 marks

Assignment : 25marks

Project / Case study : 25 marks

Total : 100 Marks

Professional English

The course offered in alignment with TANSCHE norms with 2 credits.

Quiz (5 x 20 Marks) : 100 Marks

COURSE NUMBER	COURSE NAME	CATEGORY	L	T	P	CREDIT
PL24C01	Microbiology & Plant Diversity I	Theory	88	2	-	5

Preamble

To study the characteristics and life cycle of Bacteria, Virus, Algae, Fungi and Lichens.
To study various plant diseases and their control measures.
To impart knowledge on Artificial Intelligence and its types.

Course Learning Outcomes

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

CLO Number	CLO Statement	Knowledge Level
CLO1	Understand the cellular, biochemical, and physiological aspects of mircoorganisms and recognize the similarities and differences between microbial groups (bacteria, algae, fungi, protozoa, viruses)	K1
CLO2	Acquire knowledge about the diversity of algae based on structure and reproduction	K2
CLO3	Know about the morphology, reproduction and economic importance of fungi and lichens	K3
CLO4	Identify the causes, symptoms and control measures of plant diseases	K4
CLO5	Apply the artificial intelligence to the biological science	K5

Mapping with Programme Learning Outcomes

CLOs	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	S	M	M	M	M
CLO2	S	S	S	M	M
CLO3	S	S	M	S	S
CLO4	S	M	S	M	M
CLO5	S	M	S	S	M

S- Strong; M-Medium

Syllabus

Unit I: Microbiology **19 hrs**

History and scope of microbiology. Structure and reproduction of viruses. Bacteria: Morphology, ultra structure, growth and reproduction. Bacterial classification (Bergey, 1923). Microbial techniques - methods of sterilization, culture media and pure culture techniques. Study of bacterial growth- growth curve. Gram staining.

Unit II: Algae **19 hrs**

General characteristics of algae, Classification of algae (Fritsch, 1935). A detailed study on structure, reproduction and life cycle of *Anabaena* (Cyanophyceae), *Chlamydomonas & Oedogonium* (Chlorophyceae), *Ectocarpus* (Phaeophyceae) and *Polysiphonia* (Rhodophyceae) (developmental studies on sex organs not required). Economic importance of Algae.

Unit III: Fungi and Lichens **20 hrs**

General characteristics of Fungi. Classification (Alexopoulos and Mims, 1972). Detailed study of morphology and reproduction of *Albugo* (Oomycetes), *Saccharomyces* (Ascomycetes), *Penicillium* (Plectomycetes), *Puccinia* (Teliomycetes), *Polyporus* (Agaricomycetes) and *Aspergillus* (Eurotiomycetes) (developmental studies on sex organs not required). Economic importance of Fungi.

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

Unit: IV Plant Pathology **20 hrs**

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 bio-control measures).

Unit: V Artificial Intelligence **10 hrs**

Definition; Types- Weak AI or Narrow AI, General AI and Super AI. Brief introduction to solutions to real-world problems by implementing the following AI processes/ techniques: 1-Machine Learning, 2- Deep Learning, 3- Natural Language Processing and 4- Robotics. AI to reintegrate biology: Biological knowledge discovery and assembly, Behavioural ecology, Genes to phenotypes, Prediction, evolution, and control of infectious diseases.

Text Books

S. No.	Authors	Title of the Book	Publishers	Edition & Year of publication
1.	Singh V, Pandae P.C. & Jain, D.K	A Text Book of Botany	Rastogi Publications,Meerut	5th ed., 2023-2024
2.	Vashishta, B.R., Sinha, A.E and Singh, V.P	Botany for Degree Students : Algae	S Chand and Company Ltd., New Delhi	1st ed., 2015

3.	Sharma O.P	Algae	Tata Mc Graw-Hill Education	1st ed., 2011
4.	Sharma O.P	Fungi and allied microorganisms	Tata Mc Graw-Hill Education	3rd ed., 2024
5.	Purohit, S.S	Microbiology-Fundamentals & Applications	Rastogi Publications,Meerut	7th ed., 2017
6.	Pandey, B.P	College Botany Vol I	S Chand & Company, New Delhi.	5th ed., 2021
7.	Vashishta B.R./ Sinha A.K. & Kumar Adarsh	Botany for degree students Fungi	S. Chand and CompanyLtd., New Delhi	1st ed., 2016

Reference Books

S. No.	Authors	Title of the Book	Publishers	Edition & Year of publication
1.	Alexopoulos, CJ, Mims CW & Blackwell M	Introductory Mycology	John Wiley & Sons, New York	4th ed., 2007
2.	Gangulee, HC. & KarAK	College Botany, Vol-II	New Central Book Agency Pvt. Ltd.Calcutta.	4th ed., 2011
3.	Mehrotra, RS & Aneja, KR	An Introduction to Mycology	New Age International Private Limited, New Delhi	2nd ed., 2015

Online course materials

1. https://www.researchgate.net/publication/354185787
2. https://www.edureka.co/blog/types-of-artificial-intelligence/
3. https://www.mygreatlearning.com/blog/what-is-artificial-intelligence/#WhatisArtificialIntelligence

Pedagogy

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

Course Designers

1. Dr. C. Krishnaveni
2. Dr. M. Kanchana
3. Dr. H. Rehana banu

COURSE CODE	COURSE NAME	CATEGORY	L	T	P	CREDIT
PL24C02	Plant Diversity II	Theory	88	2	-	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 Learning Outcomes

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

CLO Number	CO Statement	Knowledge Level
CLO1	Know the lifecycle of Bryophytes, Pteridophytes and Gymnosperms	K1
CLO2	Understand the characteristics of Bryophytes, Pteridophytes and Gymnosperms	K2
CLO3	Know the process of fossilization	K2
CLO4	Assess the evolutionary features of Bryophytes, Pteridophytes and Gymnosperms	K3

Mapping with Programme Learning Outcomes

CLOs	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	M	M	M	M	M
CLO2	M	M	S	M	M
CLO3	S	S	M	M	S
CLO4	S	S	M	M	M

S- Strong; M-Medium

Syllabus

Unit I - Bryophytes **18hrs**

General characteristics, Classification of Bryophytes (Reimers-1954).Occurrence, distribution, common species, structure and reproduction of *Marchantia* (Marchantiaceae), *Anthoceros*(Anthocerotaceae) and *Funaria* (Funariaceae) (developmental studies on sex organs not required).Economic and ecological importance of Bryophytes.Evolution of Bryophytes.

Unit II – Pteridophytes - I **17hrs**

General characteristics, Classification of Pteridophytes (Sporne, 1975). Stelar evolution,homospory, heterospory and seed habit. Apogamy and apospory.Economic importance of Pteridophytes.

Unit III – Pteridophytes - II **17hrs**

A detailed study of morphology, anatomy and reproduction of *Psilotum*(Psilotaceae), *Lycopodium* (Lycopodiaceae),

Equisetum (Equisetaceae) and *Marsilea* (Marsileaceae) (developmental studies on sex organs not required).Origin and evolution of Pteridophytes.

Unit IV- Gymnosperms **18hrs**

General characteristics, distribution and classification of Gymnosperms(Sporne, 1965). Detailed study of morphology, anatomy and reproduction of*Cycas* (Cycadaceae), *Pinus*(Pinaceae)and *Gnetum* (Gnetaceae)(developmental studies on sex organs not required). Economic importance of Gymnospermswith special reference to oil, resin, timber, etc.,

Unit V- Palaeobotany **18hrs**

Fossils-fossilization process andtypes of fossils - compression, impression, petrifaction, coal balls. Geological time scale. Radiocarbon dating.A detailed study of external and internal featuresand reproduction in *Rhynia* (Rhyniaceae), *Lepidodendron* (Lepidodendraceae), *Lepidocarpon* (Lepidocarpaceae), *Calamites*(Calamitaceae)and *Williamsonia sewardiana*(Williamsoniaceae).

Text Books

S.No	Authors	Title of the book	Publishers	Edition&Year of publication
1.	Sharma O.P	Textbook Of Bryophyta	Medtech Science Press	1st ed., 2024
2.	Vasishta PC, Sinha AK &Anilkumar	Pteridophyta Botany For Degree Students	S Chand & Company, New Delhi	1st ed., 2015
3.	Vasishta PC, Sinha AK &Anilkumar	Botany for degree students	S Chand And Company Ltd., New Delhi.	1st ed., 2016
4.	Pandey, B.P	College Botany Vol II	S Chand & Company, New Delhi	8th ed., 2016

Reference Books

S.No	Authors	Title of the book	Publishers	Edition&Year of publication
1.	Arnold. C. A.	An Introduction to Palaeobotany	McGraw Hill Book Company,London	2nd ed., 2005
2.	Sporne, KR	The Morphology of Gymnosperms	Hutchinson & Co., London.	2nd ed., 1974
3.	Sporne, KR	The Morphology of Pteridophytes	Hutchinson & Co., London	4th ed., 2015
4.	Steward.N.Wilson& Rothwell, W. Gar	Palaeobotany and evolution of Plants	Cambridge University Press	2nd ed., 2010

Pedagogy

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

Course Designers

1.Dr.C. Krishnaveni
2.Dr.K.S.Tamilselvi
3.Dr.B. S.Chithra Devi
4.Dr.R. Sumathi

COURSE CODE	COURSE NAME	CATEGORY	L	T	P	CREDIT
PL24CP1	Botany Practical – I	Practical	-	-	90	4

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.

Course Learning Outcomes

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

CLO Number	CLO Statement	Knowledge Level
CLO1	Identify the different forms of Algae, Fungi, Lichens, Bryophytes, Pteridophytes, Gymnosperms and fossilized plants	K1
CLO2	Know the host – pathogen interactions	K2
CLO3	Prepare sterile microbial culture media and demonstrate pure culture techniques	K3
CLO4	Interpret the industrial impact of fermentation process	K3

Mapping with Programme Learning Outcomes

CLOs	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	S	M	M	M	M
CLO2	S	S	M	M	M
CLO3	S	S	M	M	M
CLO4	S	S	M	M	M

S- Strong; M-Medium

Syllabus

Microbiology & Plant Diversity I **45 Hrs**

Algae - *Anabaena, Chlamydomonas, Oedogonium, Ectocarpus and Polysiphonia*

Fungi - *Albugo, Saccharomyces, Penicillium, Puccinia, Polyporus and Aspergillus*

Lichens -*Usnea*

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

Microbial Techniques

Sterilization 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 - Lactoglycerol trypan blue
Microscopic observation of bacteria - Gram staining staining
Fermentation using yeast

Plant Diversity II **45 Hrs**

(Bryophytes, Pteridophytes, Gymnosperms and Palaeobotany)

Study of the following types

Bryophyta- *Marchantia, Anthoceros* and *Funaria*
Pteridophyta-*Psilotum, Lycopodium, Equisetum* and *Marsilea*
Gymnosperms - *Cycas, Pinus* and*Gnetum*
Palaeobotany - *Rhynia, Lepidodendron, Lepidocarpan, Calamites* and *Williamsonia*

CourseDesigners

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