



PSGR Krishnammal College for Women



College of Excellence, **nirf** 2021-6th 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)

(Semesters– I and II)

**BACHELOR OF BOTANY
(2022 – 2025 Batch)**



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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 (PSOs)

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

BACHELOR OF BOTANY (2022-2025 Batch)
SYLLABUS & SCHEME OF EXAMINATION
Applicable to students admitted during the academic year 2022 – 2023 onwards (I & II Sem)

SEM	Part	Subject Code	Title of the Paper		Instruction hours/week	Contact hours	Tutorial	Duration of Examination	Examination Marks			Credits	
									CA	ESE	TOTAL		
I	I	TAM2201/ HIN2201/ FRE2201	Language T/H/F Paper I	Language	6	86	4	3	50	50	100	3	
	II	ENG2201	English Paper-I	English	6	86	4	3	50	50	100	3	
	IIIA		PL22C01	Core Paper I- Microbiology & Plant diversity I	CC	6	86	4	3	50	50	100	5
			PL21CP1	Core Practical – I	CC	3	45	-	-	-	-	-	-
			CE22A01/ PS22A01/ TH22A09	Allied Chemistry for Biologists Paper-I/ Allied Physics Paper-I/ Allied Paper I -Mathematical for Sciences - I	GE	4	56	4	3	50	50	100	4
						7	101	4	3	50	50	100	5
		CE21AP1 /PS21AP1	Allied Practical Chemistry / Physics	GE	3	45	-	-	-	-	-	-	
IV	NME22B1/A1 NME21ES	Basic Tamil/Advanced Tamil** Introduction to Entrepreneurship	AEC	2	-	-	3	50/ 50	50/ 50	100	2		
II	I	TAM2202/HIN 2202/FRE2202	Language T/H/F Paper - II	Language	6	86	4	3	50	50	100	3	
	II	ENG2102	English Paper-II	English	5	71	4	3	50	50	100	3	
	IIIA		PL22C02	Core Paper II – Plant diversity II(Bryophytes, Pteridophytes, Gymnosperms, and Palaeobotany)	CC	5	71	4	3	50	50	100	5
			PL21CP1	Core Practical I (Core Paper I & II)	CC	3	45	-	3	50	50	100	4

	CE22A02/ PS22A02/ TH22A14	Allied Chemistry for Biologists Paper-II / Physics Paper –II / Allied Paper II – Mathematics for Sciences II	GE	5	71	4	3	50	50	100	4
				8	116	4	3	50	50	100	5
IIIA	CE21AP1/ PS21AP1	Allied Chemistry Practical/Allied Physics Practical	GE	3	45	-	3	25	50	100	2
IV	OPS1808	Open course-self study online courses			-		-	-	-	-	-
	NME22B2/A2	Basic Tamil/Advanced Tamil**	AEC		-		-	50	-	50	-
IV	21PELS1	Professional English for Life Sciences	AEC	3	45	3	2	50	50	100	2
IIIB	NM12GAW	Foundation Course –1 (General awareness)			Self study (Online)			100	-	100	Grade

*Allied theory papers with practicals will be evaluated for 50/50 and converted into 30/45; **Outside regular class hours

CC – Core Courses

CA – Continuous Assessment

GE – Generic Elective

ESE - End Semester Examination

AEC – Ability Enhancing Course

CIA Pattern (50/50)

1. Theory - Internal assessment

Internal Component	50 Marks
CIA I	7
CIA II	7
Model Exam	10
Assignment	4
Seminar	5
Quiz	4
Class Participation	5
Application Of Knowledge, Innovation and Creativity	5
Attendance	3
Total	50 Marks

2. Practical

INTERNAL COMPONENT	50 Marks
Lab Performance (Practical+Interaction)(12+12)	24
Regularity in record submission	8
Model Examination	15
Attendance	3
Total	50 marks

3. ALC 25/75 pattern:

Internal Component (Theory)	25 Marks
CIA	10
Model exam	15
Total	25 marks

4. Project: 20 / 80 = 100 Marks

Internal Component	Marks
Internal (20 Marks)	Review I : 5 Review II: 10 Review II: 5
ESE : Evaluation of Project Viva – voce examination	60 20
Total	100 marks

5. SBS 25/75 pattern:

Internal Component (Theory)	Marks
CIA I	5
CIA II	5
Model exam	15
Total	25marks

6. CIA Question Paper Pattern: 2 x 25 = 50 Marks

One question from each unit with each question comprising of

- Two questions with a weightage of 2 marks (no choice)
- Two questions with a weightage of 6 marks (no choice)
- One question with weightage of 9 marks (Internal Choice at the same CLO level)

7. ESE Question Paper Pattern: 5 x 20 = 100 Marks

One question from each unit with each question comprising of

- One question with a weightage of 2 marks (no choice)
- One question with a weightage of 6 marks (Internal Choice at the same CLO level)
- One question with weightage of 12 marks (Internal Choice at the same CLO level)

COURSE NUMBER	COURSE NAME	CATEGORY	L	T	P	CREDIT
PL22C01	Core Paper I - Microbiology & Plant diversity I	CORE	86	4	-	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	Classify the microbes and understand the characteristics of Bacteria and 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	K2
CLO4	Identify the causes, symptoms and control measures of plant diseases	K2

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

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*, *Chlamydomonas*, *Oedogonium*, *Ectocarpus* and *Polysiphonia* (developmental studies on sex organs not required). Economic importance of Algae.

Unit III: Fungi and Lichens**19 hrs**

General characteristics of Fungi. Classification (Alexopoulos and Mims, 1972). Detailed study of morphology and reproduction of *Albugo*, *Saccharomyces*, *Penicillium*, *Puccinia*, *Polyporus* and *Aspergillus* (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**19 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**10 hrs**

Artificial Intelligence-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	Year of publication	Title of the book	Publishers
1.	Vashishta, B.R., Sinha, A.E and Singh, V.P	2013	Algae	S Chand and Company Ltd., New Delhi
2.	Sharma O.P	2011	Algae	Tata Mc Graw-Hill Education
3.	Sharma O.P	2011	Fungi and allied microorganisms	Tata Mc Graw-Hill Education
4.	Purohit, S.S	2017	Microbiology-Fundamentals	Rastogi Publications, Meerut

			&Applications (7 th edition)	
5.	Pandey, B.P	2005	College Botany Vol I	S Chand & Company, New Delhi.
6.	Vashishta B.R./ Sinha A.K. & Kumar Adarsh	2016	Botany for degree students Fungi	S. Chand and Company Ltd., New Delhi

Reference Books

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

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 NUMBER	COURSE NAME	CATEGORY	L	T	P	CREDIT
PL22C02	Core Paper II - Plant Diversity II (Bryophytes, Pteridophytes, Gymnosperms and Palaeobotany)	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

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 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

14hrs

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

Unit II - Pteridophytes**14hrs**

General characteristics and Classification of Pteridophytes (Sporne, 1975). Stellar Evolution Homospory, heterospory and seed habit. Economic importance of Pteridophytes.

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

A detailed study of morphology, anatomy and reproduction of *Psilotum*, *Lycopodium*, *Equisetum* *Marsilea* (developmental studies on sex organs not required).

Unit IV- Gymnosperms**14hrs**

General characters, distribution and classification of Gymnosperms(Sporne, 1965). Detailed study of morphology, anatomy and reproduction of *Cycas*, *Pinus* and *Gnetum*(developmental studies on sex organs not required).Economic importance of Gymnosperms.

Unit V- Palaeobotany**15hrs**

Fossils-fossilization process and Types of fossils - compression, impression, petrification, coal balls. Geological time scale. A detailed study of external and internal features and reproduction in *Rhynia*, *Lepidodendron*, *Lepidocarpan*, and *Calamites*.

Text Books

S.No	Authors	Year of publication	Title of the book	Publishers
1.	Vasishta.B.R , Sinha & Adarsh Kumar	2012	Botany for Degree students –Bryophyta	S Chand And Company Ltd., New Delhi
2.	Sharma O.P	2011	Bryophyta	Tata Mc Graw-Hill Education
3.	Sharma O.P	2011	Pteridophyta	Tata Mc Graw-Hill Education
4.	Vasishta PC, Sinha AK & Anilkumar	2005	Botany for degree students,	S Chand And Company Ltd., New Delhi.
5.	Pandey, B.P	2003	College Botany Vol II	S Chand & Company, New Delhi

Reference Books

S.No	Authors	Year of publication	Title of the book	Publishers
1.	Arnold. C. A.	2013	An Introduction to Palaeobotany	McGraw Hill Book Company, London
2.	Sporne, KR	1974	The Morphology of Gymnosperms	Hutchinson & Co., London.

3.	Sporne, KR	2015	The Morphology of Pteridophytes	Hutchinson & Co., London
4.	Steward.N.Wilson & Rothwell, W. Gar	2005	Palaeobotany and evolution of Plants	Cambridge University Press

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 NUMBER	COURSE NAME	CATEGORY	L	T	P	CREDIT
PL21CP1	Core Practical – I (Theory Paper - I & II – Microbiology, Plant diversity I and Plant Diversity II)	CORE	-	-	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 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 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 staining,

Microscopic observation of bacteria- Gram 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* and *Calamites*

Course Designers:

1. Dr. C. Krishnaveni
2. Dr. M. Kanchana
3. Dr. K.S. Tamil Selvi
4. Dr. H. Rehana banu
5. Dr.E. Uma

COURSE NUMBER 21PELS1	COURSENAME SEMESTER– II PROFESSIONAL ENGLISH FOR LIFE SCIENCES	Category	L	T	P	Credit
		-	40	5	--	2

Objectives

1. To develop the language skills of students by offering adequate practice in professional contexts.
2. To enhance the lexical, grammatical and socio-linguistic and communicative competence of first year physical sciences students
3. To focus on developing students' knowledge of domain specific registers and the required language skills.
4. To develop strategic competence that will help in efficient communication
5. To sharpen students' critical thinking skills and make students culturally aware of the target situation.

Course outcome

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

CLO Number	CO Statement	Knowledge Level
CLO1	Recognize their own ability to improve their own competence in using the language	K1
CLO2	Use language for speaking with confidence in an intelligible and acceptable manner	K2
CLO3	Read independently unfamiliar texts with comprehension and understand the importance of reading for life	K3
CLO4	Understand the importance of writing in academic life	K3
CLO5	Write simple sentences without committing error of spelling or grammar	K3

(Outcomes based on guidelines in UGC LOCF – Generic Elective)

Mapping with Programme Outcomes

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

S- Strong; M-Medium

Syllabus

UNIT 1: Communication

8 hours

Listening: Listening to audio text and answering questions listening to Instructions

Speaking: Pair work and small group work.

Reading: Comprehension passages –Differentiate between facts and opinion

Writing: Developing a story with pictures.

Vocabulary: Register specific - Incorporated into the LSRW tasks

UNIT 2: Description

8 hours

Listening: Listening to process description.-Drawing a flow chart.

Speaking: Role play (formal context)

Reading: Skimming/Scanning- Reading passages on products, equipment and gadgets.

Writing: Process Description –Compare and Contrast Paragraph-Sentence Definition and Extended definition- Free Writing.

Vocabulary: Register specific -Incorporated into the LSRW tasks.

UNIT 3: Negotiation Strategies

8 hours

Listening: Listening to interviews of specialists / Inventors in fields (Subject specific)

Speaking: Brainstorming. (Mind mapping).Small group discussions (Subject- Specific)

Reading: Longer Reading text.

Writing: Essay Writing (250 words)

Vocabulary: Register specific - Incorporated into the LSRW tasks

UNIT 4: Presentation Skills

8 hours

Listening: Listening to lectures.

Speaking: Short talks.

Reading: Reading Comprehension passages

Writing: Writing Recommendations Interpreting Visuals inputs

Vocabulary: Register specific - Incorporated into the LSRW tasks

UNIT 5: Critical Thinking Skills

8 hours

Listening: Listening comprehension- Listening for information.

Speaking: Making presentations (with PPT- practice).

Reading : Comprehension passages –Note making.Comprehension: Motivational article on Professional Competence, Professional Ethics and Life Skills)

Writing: Problem and Solution essay– Creative writing –Summary writing

Vocabulary: Register specific - Incorporated into the LSRW tasks

Textbooks

S.No.	Authors	Title of the Book	Publishers	Year of Publication
1	TamilNadu State Council for Higher Education (TANSCHÉ)	English for Life Sciences Semester 1	--	--

Reference Books

S.No.	Authors	Title of the Book	Publishers	Year of Publication
1	Sreedharan, Josh	The Four Skills for Communication	Foundation books	2016
2	Pillai, G Radhakrishna, K Rajeevan, P Bhaskaran Nair	Spoken English for you	Emerald	1998
3	Pillai, G radhakrishna, K Rajeevan, P Bhaskaran Nair	Written English for you	Emerald	1998

Evaluation pattern : Internal 50 marks
ESE 50 marks

NOTE :

Internals: 5 tests x 10 marks each =Total 50 marks

Test 1 : Listening

Test 2 : Speaking

Test 3 : Reading

Test 4 : Listening

Test 5 : Speaking

ESE : Only Reading, Writing and Vocabulary components from all 5 units

Question Paper pattern for ESE

Section A : 5 x 2 = 10 marks

Section B : 4/6 x 5 = 20 marks

Section C : 2/3 x 10 = 20 marks

Total = 50 Marks