SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI

(AFFILIATED TO MADURAI KAMARAJ UNIVERSITY, MADURAI
RE-ACCREDITED WITH 'A' GRADE (THIRD CYCLE) BY NAAC WITH CGPA 3.11)

Programme Scheme, Scheme of Examination and Syllabi

(From 2023-2024 Batch onwards)

Department of Botany

UG Programme

Approved in the Academic Council – XIV held on 31/07/2023

Curriculum Design and Development Cell

Annexure O

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI

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Curriculum Design and Development Cell

HOD	Dean of Pure Science	Dean of Academic Affairs	Principal

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI

DEPARTMENT OF BOTANY

MEMBERS OF BOARD OF STUDIES

S.No.	Board Members	Name and Designation
1.	Chairman of the Board	**Dr. M. Sujatha** Head & Assistant Professor Department of Botany Sri Kaliswari College (Autonomous), Sivakasi.
2.	University Nominee	**Dr. M. Jayalakshmi** Associate Professor & Head i/c Department of Immunology School of Biological Sciences Madurai Kamaraj University Madurai -625021
3.	Academic Expert 1.	**Dr.R. Ramasubbu** Assistant Professor Department of Biology The Gandhigram Rural Institute (Deemed to be University), Gandhigram Dindigul District.
4.	Academic Expert 2.	**Dr M.Venkatesan** Assistant Professor, Department of Botany, Sourashtra College, Madurai
5.	Industrialist	**Mr. R. Govindaraj** Sri Marutham Agro Biotech, Madurai
6.	Alumnus	**Ms. C. Karolinsobina** Mother Teresa University for Women Kodaikkanal
Members		
7.	Dr. R. Narayanaprakash	Guest Faculty in Botany
8.	Dr. M. Murugan	Assistant Professor of Botany
9.	Dr. A. Sarvalingam	Assistant Professor of Botany
10.	Mrs. G. Mareeswari	Assistant Professor of Botany
11.	Dr. G. Varatharaju	Assistant Professor of Botany
12.	Dr. J. Sureshkumar	Assistant Professor of Botany
13.	Mr. E. Fredrickraja	Assistant Professor of Botany

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI

(Affiliated to Madurai Kamaraj University, Re-accredited with A Grade (CGPA 3.11) by NAAC)

DEPARTMENT OF BOTANY

UG Programme - B.Sc. Botany

GUIDELINES FOR OUTCOME-BASED EDUCATION WITH CHOICE BASED CREDIT SYSTEM

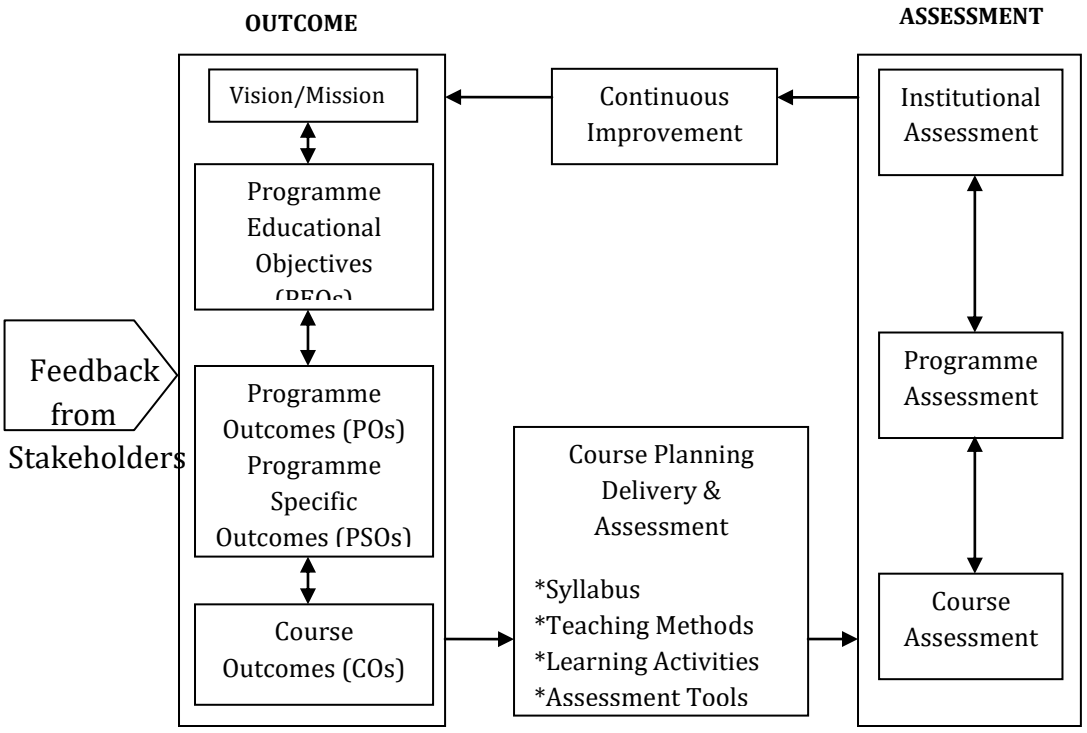
(From 2023-2024 Batch onwards)

INTRODUCTION

Sri Kaliswari College in its pursuit of imparting quality education has marked a remarkable growth in terms of academic excellence, infrastructure, student strength, ICT facilities, library and placement records since its establishment in 2000-2001.This institution constitutes an academic community that is committed to encourage the student community to experience and share knowledge, identify their potential, enhance the employability skills and enable them to pursue their goals. After the conferment of autonomous status in the year 2012, the college has so far gone for revision of the syllabi three times and is continually updating the syllabi to meet the needs and demands of the student community.

The institution in its success journey of imparting quality education has been Re-Accredited with A grade (CGPA 3.11) in its third cycle of accreditation by NAAC. As an added feather to its cap, the institution has taken a giant leap to embrace the Outcome-Based Education system to enable the student community to develop their knowledge, skill and attitude simultaneously through a focussed learning and help the graduates to compete with their global counterparts and prepare them for life.

I. OUTCOME-BASED EDUCATION (OBE) FRAMEWORK



II. VISION OF THE INSTITUTION

- To impart quality higher education to produce highly talented youth capable of developing the nation

III. MISSION OF THE INSTITUTION

- Ensuring quality in all aspects of the activities
- Developing the latent skills of the rural youth
- Providing value - based education to instil courage and confidence
- Nurturing the entrepreneurial skills of the rural youth
- Creating competency to meet global challenges
- Imbibing social awareness and social responsibilities

IV. VISION OF THE DEPARTMENT

- To impart fundamental and modern knowledge of plant science and to create an environment to carryout innovative research work and conserve nature.

V. MISSION OF THE DEPARTMENT

- To develop the Department as a leading centre of Plant science at Local, Regional & National level
- To provide a student-centred and profession-oriented higher education and promote research work in the field of Plant Science
- To encourage rural youth to become competent and socially responsible professionals and entrepreneurs in the field of Plant Science

VI. PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

The graduates will

PEO1: demonstrate in-depth theoretical knowledge and practical skills in Plant Science and be sufficiently competent in the field to undertake further discipline-specific higher studies.

PEO2: display knowledge in understanding research and addressing practical problems, possess critical skill and analytical reasoning in solving problems in workplace and in day to day life.

PEO3: imbibe moral, ethical and professional values to preserve nature for a better life in the society.

PEO4: demonstrate communication skills and digital skills to interpret scientific concepts and display professional skills to take up a career in industry or agricultural field.

PEO5: adopt new technologies and constantly upgrade their skills and possess the critical acumen to be responsive to the societal needs through independent and life-long learning.

VII. PROGRAMME OUTCOMES (POs)

Programme Outcomes are narrower statements that describe what students are expected to know and be able to do upon the graduation. These relate to the skills, knowledge and behaviour that students acquire in their study through the programmes.

PO1: Disciplinary knowledge
Acquire comprehensive and scientific knowledge in the field of Science.

PO2: Critical thinking, Problem solving and Analytical reasoning
Develop students' ability of critical observation and capacity to apply the principles/facts of science to identify, analyse, evaluate and solve problems in order to draw realistic conclusions.

PO3: Scientific reasoning and Research related skills
Capability to involve in planning and conducting experiments, analyze the scientific research field, interpret and draw conclusions from experiments and investigate practically.

PO4: Communication skills and Digital literacy
Communicate effectively and articulate clearly the scientific ideas in written and oral form and make use of appropriate software for scientific computations and gain ICT skills to disseminate knowledge.

PO5: Ethics, Values and Multicultural competence

Embrace moral and ethical values and apply it with a sense of responsibility in the workplace and community and adopt objective, unbiased and truthful actions in all aspects of work.

PO6: Team Work, Leadership and Employability skills

Work effectively and respectfully in groups with enhanced inter-personal skills and exhibit qualities associated with leadership to build a team and achieve the vision and show proficiency in professional, employability and soft skills required for placements and higher education.

PO7: Self-directed and Life-long learning

Recognize the need and have the ability to engage in independent learning and be self-motivated and acquire knowledge through lifelong learning in the broadest context of technological change.

VIII. PROGRAMME SPECIFIC OUTCOMES (PSOs) – B.Sc. BOTANY

On the successful completion of B.Sc. Botany, the students will

PSO1: obtain fundamental and advanced knowledge of plant science

PSO2: acquire practical skills to gather information, analyze and propose new ideas to solve problems and develop entrepreneurial skills.

PSO3: obtain knowledge and technical skill through various botanical field research that develop critical and independent thinking.

PSO4: communicate effectively and articulate clearly the scientific ideas by applying statistical skills and Bioinformatics tool and make use of appropriate software to analyze the biological data.

PSO5: imbibe Bio safety and bio-ethical values with a sense of responsibility in the field of Plant Recombinant DNA Technology and genetically modified crops.

PSO6: acquire inter-personal skills and leadership skills to build a team and become an entrepreneur in the field of Mushroom cultivation, Horticulture farms, Biofertilizer, *Azolla* and *Spirulina* production and in other fields.

PSO7: recognize the need of self learning through Internship programme, group Project, courses by NPTEL, MOOC and to acquire knowledge through self-directed and lifelong learning.

IX. PO-PSO Mapping Matrix – B.Sc. BOTANY

PSO / PO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
PO1	✓						
PO2		✓					
PO3			✓				
PO4				✓			
PO5					✓		
PO6						✓	
PO7							✓

X. PO-PEO Mapping Matrix – B.Sc. BOTANY

PEO / PO	PEO1	PEO2	PEO3	PEO4	PEO5
PO1	✓			✓	
PO2		✓		✓	✓
PO3		✓		✓	✓
PO4		✓			
PO5		✓	✓		✓
PO6		✓		✓	✓
PO7				✓	✓

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI

(Affiliated to Madurai Kamaraj University, Re-accredited with A Grade (CGPA 3.11) by NAAC)

DEPARTMENT OF BOTANY

UG Programme - B.Sc. Botany

REGULATIONS

Duration of the Programme **:** Three years (equivalent to six semesters)

Eligibility

Candidate should have passed the Higher Secondary Examinations conducted by the Board of Higher Secondary Education, Government of Tamil Nadu or any other examination accepted by the Syndicate of the Madurai Kamaraj University, Madurai as its equivalent.

Medium of Instruction : English

Age Limit

Maximum age limit : 21 Years

Age Relaxation

SC/ SCA/ST/BC/BCM/MBC/DNC & Women : 3 years age relaxation

Differently-Abled Students : 5 years age relaxation

Transitory Permission

Students joined from 2023 - 2024 may be permitted to write their examinations in this pattern up to April 2031.

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF BOTANY
UG Programme - B.Sc. Botany
SCHEME OF EXAMINATION

For all the UG Programmes, the internal and external marks are distributed as follows:

For all Theory Courses (Part I, II, III): Internal Marks: 25; External Marks: 75

For Courses with both Theory and Practical, it will be considered as practical course and assessment will be for both Theory and Practical.

For Part-IV Courses : Internal Marks: 25; External Marks: 50(Converted to 75)

For all Practical Courses, Project and Internship : Internal Marks: 25; External Marks: 75

Internal Mark Distribution for Theory Courses

Assessment Type	Marks	Scheme of Assessment
Internal Test	10 marks	Two Internal Tests and 1 Model Exam will be conducted and average of the best two will be considered
Written Assignment E-Assignment/ Case Studies/ Reviews/ Field Assignments/ Poster Presentations/ Portfolios	5 marks	Any two of the Assignments will be given and the average of the two will be considered
Quiz	5 marks	One Quiz Test will be conducted
Viva/ Oral Exam/ Group Discussion/ Role Play	5 marks	Test will be conducted in any one of the Oral Mode

Internal Mark Distribution for Practical Courses

Assessment Type	Marks	Scheme of Assessment
Lab work /Program Execution	15 marks	Two Internal Tests will be conducted and the average of the two will be considered
Observation/Record Notebook	5 marks	Assessment will be done during every practical class
Viva –Voce / Lab Quiz	5 marks	Two Lab Quiz Tests/viva-voce will be conducted and the average of the two will be considered

External Mark Distribution for Practical Courses

Assessment Type	Marks	Scheme of Assessment
Lab work/Program Execution	65 marks	End result of the Practical
Viva –Voce	10 marks	Oral Mode Test

Internal Mark Distribution for Courses with both Theory and Practical

Assessment Type	Marks	Scheme of Assessment
Internal Test	10 marks	Two Internal Tests and 1 Model Exam will be conducted and average of the best two will be considered
Written Assignment E-Assignment/ Case Studies/ Reviews/ Field Assignments/ Poster Presentations/ Portfolios	5 marks	Any two of the Assignments will be given and the average of the two will be considered
Lab work /Program Execution	10 marks	Two Internal Tests will be conducted and the average of the two will be considered

External Mark Distribution for Courses with both Theory and Practical

Assessment Type	Marks	Scheme of Assessment
External Written Test	50 marks	Two hours External Exam will be conducted for 50 marks
Lab work /Program Execution	20 marks	End result of the Practical
Viva –Voce	05 marks	Oral Mode Test

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF BOTANY
UG Programme - B.Sc. Botany
QUESTION PAPER PATTERN FOR PART- I, PART- II & PART-III COURSES

Internal Test – 30 Marks – 1 hr Duration

S.No	Type of Questions	Marks
1.	Objective type Questions: Multiple Choice – 3 questions Answer in a Word/Sentence – 3 questions	 03 03
2.	Short Answer–2 questions –either or type	2x7=14
3.	Long Answer–1 question – either or type	1x10=10

Summative Examinations – For Part- I, Part- II & Part-III Courses
75 Marks -3 hrs Duration

S.No	Type of Questions	Marks
1.	Objective type Questions: Multiple Choice – 5 questions Answer in a Word/Sentence – 5 questions	 05 05
2.	Short Answer - 5 questions – either or type	5x7=35
3.	Long Answer - 3 questions – either or type	3x10=30

QUESTION PAPER PATTERN FOR PART -IV COURSES
Internal Test- 30 Marks – 1 hr Duration

S.No	Type of Questions	Marks
1.	Objective type Questions: Multiple Choice – 5 questions	 05
2.	Short Answer - 3 questions – either or type	3x5=15
3.	Long Answer - 1 question – either or type	01x10=10

Summative Examinations – For Part-IV Courses 50 Marks (converted to 75)
-2 hrs Duration

S.No	Type of Questions	Marks
1.	Objective type Questions: Multiple Choice – 10 questions	 10
2.	Short Answer - 4 questions – either or type	4x5=20
3.	Long Answer - 2 questions – either or type	02x10=20

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF BOTANY
UG Programme - B.Sc. Botany

Attainment of Course outcomes

Attainment of Course outcomes is computed using Direct and Indirect assessment methods. Direct Method of Assessment is based on performance of the students in the Continuous Internal Assessment Tests, Summative Examinations and supporting activities such as Seminar, Assignment, Case study, Group Discussion, Quiz, etc., and Indirect Method of Assessment is based on periodical feedback from the students at the end of each course.

Weightage of Direct and Indirect Assessment in computation of attainment of each course is 70% for Direct Assessment and 30% for Indirect Assessment.

Direct Assessment of Course outcome attainment

i) Rubrics:

Internal Assessment contributes 60% and Summative Examinations Assessment contributes 40% to the Direct Assessment of a course outcome for Theory Courses. For the Practical Courses, Internal Assessment contributes 70% and Summative Examinations Assessment contributes 30% to the Direct Assessment of a course outcome.

ii) Setting of Target:

50% of the maximum mark is set as target of Internal Assessment tools and the average mark of the class is set as target of Summative Examinations Assessment.

Formula for calculating percentage attainment of each course outcome

Based on the result of Summative Examinations and Internal Assessment tools, the number of students scoring more than the target is found out.

For each Internal Assessment Tools,

$$\text{Percentage attainment of each course outcome} = \frac{\text{No. of. Students who scored more than the target in the concerned course outcome}}{\text{Total Number of Students}} \times 100$$

Percentage attainment of each Course outcome for Internal Assessment tools = Average of percentage attainment of all Internal Assessment tools

For Summative Examinations,

$$\text{Percentage attainment of each Course outcome} = \frac{\text{No. of Students who scored more than the target in the concerned CO}}{\text{Total Number of Students}} \times 100$$

Formula for calculating Attainment Percentage of Course outcome of a course

Percentage Attainment of Course outcome for Internal Assessment tools	=	Average of percentage attainment of all COs
Percentage Attainment of Course outcome for Summative Examinations	=	Average of percentage attainment of all COs

Final Direct Assessment of Course Outcome Attainment

For Theory Courses

Percentage Attainment of Course outcome through Direct Assessment	=	(0.6 x percentage attainment of CO for internal assessment tool) + (0.4 x percentage attainment of CO for summative examinations)

For Practical Courses

Percentage Attainment of Course outcome through Direct Assessment	=	0.7 x percentage attainment of CO for Internal Assessment tools + 0.3 x percentage attainment of CO for Summative Examinations

Indirect Assessment of CO Attainment

The course outcome feedback is conducted at the end of every semester by distributing structured feedback questionnaire to the students. The analysis of this feedback questionnaire is done on the following score. The feedback forms will be sorted with various scores and feedbacks with a score more than 5.5 are considered as satisfactory level for calculations for indirect attainment.

A : 10-8.5 **B :** 8.4-7.0 **C :** 6.9-5.5 **D :** 5.4-4.0 **E :** 3.9-0

Percentage attainment for each CO = $\frac{\text{Satisfaction Number}}{\text{Response Received}} \times 100$

Percentage Attainment of CO of a course = Average of percentage attainment of all COs

Final Assessment of CO attainment

Average course attainment = 0.7 x Direct assessment of CO attainment + 0.3 x Indirect assessment of CO attainment

Expected Level of Attainment for each of the Course Outcomes

CO	Level of Attainment
= 70% and above	Excellent
= 60% - <70 %	Very good
= 50% -< 60 %	Good
= 40% - < 50 %	Satisfactory
Below 40%	Not Satisfactory

Assessment of PO attainment

At the end of the each programme, the Direct PO Assessment is done from the CO Attainment of all courses. The Direct PO Attainment for a particular course is determined from the attainment values obtained for each course outcome related to that PO and the CO-PO mapping values.

Weighted contribution of the course in attainment of each PO = $\frac{\text{Weighted Percentage of contribution of the course in attainmentof each PO}}{\text{average course attainment}} \times 100$

Expected Level of Attainment for each of the Programme Outcomes

PO	Level of Attainment
= 70% and above	Excellent
= 60% - <70 %	Very good
= 50% -< 60 %	Good
= 40% - < 50 %	Satisfactory
Below 40%	Not Satisfactory

Attainment of Programme Educational Objectives (PEO)

PEOs are assessed after 3 to 4 years of graduation. Attainment is measured based on the Feedback from Stakeholders

1. Alumni
2. Parents
3. Employer

The analysis of this feedback questionnaire is done on the following score. The feedback forms will be sorted with various scores and feedbacks with a score more than 5.5 are considered as satisfactory level for calculations for Indirect Attainment.

A : 10-8.5 **B :** 8.4-7.0 **C :** 6.9-5.5 **D :** 5.4-4.0 **E :** 3.9-0

$$\text{Percentage attainment of PEOs} = \frac{\text{Satisfaction number}}{\text{Response Received}} \times 100$$

Expected Level of Attainment for each of the Programme Educational Objectives

PEO	Level of Attainment
= 70% and above	Excellent
= 60% - <70 %	Very good
= 50% -< 60 %	Good
= 40% - < 50 %	Satisfactory
Below 40%	Not Satisfactory

SRI KALISWARI COLLEGE (AUTONOMOUS), Sivakasi

DEPARTMENT OF BOTANY

UG Programme - B.Sc. Botany

CURRICULUM STRUCTURE

OUTCOME-BASED EDUCATION WITH CHOICE BASED CREDIT SYSTEM

(From 2023-2024 Batch onwards)

Part	Courses	Sem I	Sem II	Sem III	Sem IV	Sem V	Sem VI	Credits
I	Tamil/ Hindi	6(3)	6(3)	6(3)	6(3)	-	-	12
II	English	6(3)	6(3)	6(3)	6(3)	-	-	12
	Core Courses	4(4) 4P(4)	4(4) 4P(4)	4(4) 4P(4)	4(4) 3P(3)	4(3) 4(3) 4(3) 3P(3) 3P(3) 4(3)	5(3) 5(3) 5(3) 5P(4)	62
	Elective Courses Generic/ Discipline Specific	4(3) 2P(2)	4(3) 2P(2)	4(3) 2P(2)	4 (3) 2P(2)	3(2) 3(2)	4(3) 4(3)	30
IV	Skill Enhancement Courses	2(2)F 2(2) NME	2(2) 2(2) NME	1(1)E 2(2)	2(2) 2(2)		2(2)	17
	Environmental studies	-	-	1	1(2)	-	-	02
	Value education	-	-	-	-	2(2)	-	02
	Internship/ Industrial Training	-	-	-	-	(2)	-	02
V	Extension Activity	-	-	-	-	-	(1)	1
Total Hours (Per week)/Credits		30(23)	30(23)	30(22)	30(24)	30(26)	30(22)	140 180

Self-Paced Learning (Swayam Course)	-	-	-	-	-	1 Credit	1 Credit

SRI KALISWARI COLLEGE (AUTONOMOUS), Sivakasi
DEPARTMENT OF BOTANY
UG Programme - B.Sc. Botany
CURRICULUM PATTERN
OUTCOME-BASED EDUCATION WITH CHOICE BASED CREDIT SYSTEM
(From 2023-2024 Batch onwards)
PROGRAMME CODE – UBY

Semester	Part	Course code	Course Name	Hours	Credits	Internal Marks	External Marks
I	I	23UTAG11	Podhu Tamil/Hindi-I	6	3	25	75
	II	23UENL11	General English–I	6	3	25	75
	III	23UBYC11	**Core Course - I:** Plant Diversity I–Algae	4	4	25	75
		23UBYC1P	**Core Course - II:** Practical: Plant Diversity I-Algae	4	4	25	75
		23UBYA11	**Elective Course Generic/ Discipline Specific -I:** General and Applied Zoology	4	3	25	75
		23UBYA1P	**Elective Course Generic/ Discipline Specific -I:** Practical: General and applied Zoology and Conceptual Zoology	2	2	25	75
	IV	23UBYS11	**Skill Enhancement Course - I: Foundation course:** Basic Botany	2	2	25	75
		23UBYN11 23UBYN12 23UBYN13	**Skill Enhancement Courses - II: Non Major Elective Course :** 1. Organic farming 2. Environmental Biotechnology 3. Nursery and Landscape Management	2	2	25	75
			Total	**30**	**23**		
II	I	23UTAG21	Podhu Tamil/Hindi-II	6	3	25	75
	II	23UENL21	General English–II	6	3	25	75
	III	23UBYC21	**Core Course - III:** Plant Diversity II – Fungi, Bacteria, Viruses, Plant pathology and Lichens	4	4	25	75
		23UBYC2P	**Core Course - IV:** Practical: Plant Diversity II – Fungi, Bacteria, Viruses, Plant pathology and Lichens	4	4	25	75
		23UBYA21	**Elective Course Generic/ Discipline Specific - II** Conceptual Zoology	4	3	25	75
		23UBYA2P	**Elective Course Generic/ Discipline Specific -II:** Practical: General and Applied Zoology and Conceptual Zoology	2	2	25	75
	IV	23UBYS21	**Skill Enhancement Course – III:** Botanical garden and Landscaping	2	2	25	75
		23UBYN21 23UBYN22	**Skill Enhancement Courses- IV : Non Major Elective Courses:** 1. Mushroom cultivation 2. Herbal Medicine	2	2	25	75

		23UBYN23	3. Global Climate change				
			Total	**30**	**23**		
III	**I**	23UTAG31	Podhu Tamil/Hindi-III	6	3	25	75
	II	23UENL31	General English–III	6	3	25	75
	III	23UBYC31	**Core Course - V:** Plant Diversity III - Bryophytes and Pteridophytes	4	4	25	75
		23UBYC3P	**Core Course - VI:** Practical: Plant Diversity III- Bryophytes and Pteridophytes	4	4	25	75
		23UBYA31	**Elective Course Generic/ Discipline Specific- III:** Chemistry for Biological Sciences – I	4	3	25	75
		23UBYA3P	**Elective Course Generic/ Discipline Specific- III:** Practical: Chemistry for Biological Sciences – I	2	2	25	75
	IV	23UBYS31	**Skill Enhancement Course - V: (Entrepreneurial Skill)-** Entrepreneurial opportunities in Botany	1	1	25	75
		23UBYS32	**Skill Enhancement Course- VI:** Herbal Technology	2	2	25	75
		-	Environmental studies	1	-	-	-
			Total	**30**	**22**		
IV	**I**	23UTAG41	Podhu Tamil/Hindi-IV	6	3	25	75
	II	23UENL41	General English–IV	6	3	25	75
	III	23UBYC41	**Core Course - VII:** Plant Diversity IV - Gymnosperms, Paleobotany and Evolution	4	4	25	75
		23UBYC4P	**Core Course - VIII:** Practical: Plant Diversity IV - Gymnosperms, Paleobotany and Evolution	3	3	25	75
		23UBYA41	**Elective Course Generic/ Discipline Specific- IV:** Chemistry for Biological Sciences – II	4	3	25	75
		23UBYA4P	**Elective Course Generic/ Discipline Specific- IV:** Practical: Chemistry for Biological Sciences – II	2	2	25	75
	IV	23UBYS41	**Skill Enhancement Course - VII: Industry Module:** Cultivation of Algae	2	2	25	75
		23UBYS42	**Skill Enhancement Course -VIII:** Environmental impact analysis	2	2	25	75
		23UESR41	Environmental Studies	1	2	25	75
			Total	**30**	**24**		
V	**III**	23UBYC51	**Core Course - IX:** Plant Morphology, Taxonomy and Economic Botany	4	3	25	75
		23UBYC52	**Core Course - X:** Plant Anatomy and Embryology	4	3	25	75
		23UBYC53	**Core Course - XI:** Cell Biology, Genetics and Plant Breeding	4	3	25	75
		23UBYC5P	**Core Course - XII:** Practical: Plant Morphology, Taxonomy And Economic Botany	3	3	25	75
		23UBYC5Q	**Core Course - XIII:** Practical: Plant Anatomy, Embryology, Cell Biology, Genetics and Plant Breeding	3	3	25	75
		23UBYJ51	**Core Course – XIV:** Project with Viva-voce	4	3	25	75

		23UBYO51 23UBYO52 23UBYO53	**Elective Courses Generic/ Discipline Specific- V:** 1. Bio-Analytical Techniques 2. Aquatic Botany 3. Entrepreneurial Botany	3	2	25	75
		23UBYO54 23UBYO55 23UBYO56	**Elective Courses Generic/Discipline Specific- VI:** 1. Emerging molecular Techniques 2. Plant Resources and Utilization 3. Prospectives of Medicinal Plants	3	2	25	75
	IV	23UVED51	Value Education	2	2	25	75
		23UBYJ52	Internship/Industrial Training	-	2	25	75
			Total	**30**	**26**		
VI	**III**	23UBYC61	**Core Course - XV:** Plant Ecology and Phytogeography	5	3	25	75
		23UBYC62	**Core Course - XVI:** Plant Biotechnology and Molecular Biology	5	3	25	75
		23UBYC63	**Core Course - XVII:** Plant Physiology and Plant Biochemistry	5	3	25	75
		23UBYC6P	**Core Course - XVIII:** Practical: Plant Ecology, Phytogeography, Plant Biotechnology, Molecular Biology, Plant Physiology and Plant Biochemistry	5	4	25	75
		23UBYO61 23UBYO62 23UBYO63	**Elective Courses Generic/ Discipline Specific- VIII:** 1. Horticulture 2. Natural Resource Management 3. Forestry	4	3	25	75
		23UBYO64 23UBYO65 23UBYO66	**Elective Courses Generic/ Discipline Specific-IX:** 1. Bionanotechnology 2. Computer applications in Botany 3. Forensic Botany	4	3	25	75
	IV	23UBYS61 23UBYS62 23UBYS63	**Skill Enhancement Courses –IX: Professional Competency Course:** 1. Botany for Competitive examinations 2. General Studies for Competitive examination 3. Botany for Advanced Studies	2	2	25	75
	V		Extension activity	--	1	100	-
			Total	**30**	**22**		

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI

DEPARTMENT OF BOTANY

UG Programme - B.Sc. Botany

CURRICULUM STRUCTURE

OUTCOME-BASED EDUCATION WITH CHOICE BASED CREDIT SYSTEM

(From 2023-2024 Batch onwards)

PROGRAMME ARTICULATION MATRIX (PAM) - WEIGHTAGE OF COURSES CONTRIBUTING TO PO

Semester	Part	Course code	Course Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7
I	I	23UTAG11	Podhu Tamil/Hindi-I	10	7	2	8	2	2	3
	II	23UENL11	General English–I	10	7	2	8	2	2	3
	III	23UBYC11	**Core Course - I:** Plant Diversity I–Algae	15	15	15	12	12	11	11
		23UBYC1P	**Core Course - II:** Practical: Plant Diversity I-Algae	15	14	14	13	11	11	11
		23UBYA11	**Elective Course Generic/ Discipline Specific -I:** General and Applied Zoology	13	13	11	13	11	11	11
		23UBYA1P	**Elective Course Generic/ Discipline Specific -I:** Practical: General and applied Zoology and Conceptual Zoology	12	10	11	8	8	8	11
	IV	23UBYS11	**Skill Enhancement Course - I: Foundation course:** Basic Botany	13	13	10	13	7	11	8
		23UBYN11 23UBYN12 23UBYN13	**Skill Enhancement Courses - II: Non Major Elective Course :** 1. Organic farming 2. Environmental Biotechnology 3. Nursery and Landscape Management	12	12	9	11	8	11	11
II	I	23UTAG21	Podhu Tamil/Hindi-II	10	8	2	8	2	2	3
	II	23UENL21	General English–II	10	8	2	8	2	2	3
	III	23UBYC21	**Core Course - III:** Plant Diversity II – Fungi, Bacteria, Viruses, Plant pathology and Lichens	15	14	14	12	12	11	11

		23UBYC2P	**Core Course - IV:** Practical: Plant Diversity II – Fungi, Bacteria, Viruses, Plant pathology and Lichens	14	15	14	11	11	11	14
		23UBYA21	**Elective Course Generic/ Discipline Specific - II** Conceptual Zoology	12	10	11	8	8	8	11
		23UBYA2P	**Elective Course Generic/ Discipline Specific -II:** Practical: General and Applied Zoology and Conceptual Zoology	12	10	11	8	8	8	11
	IV	23UBYS21	**Skill Enhancement Course – III:** Botanical garden and Landscaping	13	13	10	13	7	11	8
		23UBYN21 23UBYN22 23UBYN23	**Skill Enhancement Courses- IV : Non Major Elective Courses:** 1. Mushroom cultivation 2. Herbal Medicine 3. Global Climate change	13	6	5	11	2	8	7
III	**I**	23UTAG31	Podhu Tamil/Hindi-III	10	8	2	8	2	2	2
	II	23UENL31	General English–III	10	8	3	9	3	3	2
	III	23UBYC31	**Core Course - V:** Plant Diversity III - Bryophytes and Pteridophytes	15	15	14	12	11	3	5
		23UBYC3P	**Core Course - VI:** Practical: Plant Diversity III- Bryophytes and Pteridophytes	15	15	14	14	11	2	4
		23UBYA31	**Elective Course Generic/ Discipline Specific- III:** Chemistry for Biological Sciences – I	13	10	5	4	2	3	2
		23UBYA3P	**Elective Course Generic/ Discipline Specific- III:** Practical: Chemistry for Biological Sciences – I	13	10	5	2	2	4	3
	IV	23UBYS31	**Skill Enhancement Course - V: (Entrepreneurial Skill)-** Entrepreneurial opportunities in Botany	13	13	9	9	11	3	4
		23UBYS32	**Skill Enhancement**	13	12	11	15	15	4	4

			Course- VI: Herbal Technology							
		-	Environmental studies	0	0	0	0	0	0	0
IV	**I**	23UTAG41	Podhu Tamil/Hindi-IV	10	8	2	9	2	2	2
	II	23UENL41	General English–IV	10	9	3	8	2	3	3
	III	23UBYC41	**Core Course - VII:** Plant Diversity IV - Gymnosperms, Paleobotany and Evolution	15	15	14	12	10	4	5
		23UBYC4P	**Core Course - VIII:** Practical: Plant Diversity IV - Gymnosperms, Paleobotany and Evolution	14	14	14	13	13	3	3
		23UBYA41	**Elective Course Generic/ Discipline Specific- IV:** Chemistry for Biological Sciences – II	13	10	5	4	2	3	2
		23UBYA4P	**Elective Course Generic/ Discipline Specific- IV:** Practical: Chemistry for Biological Sciences – II	13	13	10	7	-	7	7
	IV	23UBYS41	**Skill Enhancement Course - VII: Industry Module:** Cultivation of Algae	13	11	8	13	7	4	4
		23UBYS42	**Skill Enhancement Course -VIII:** Environmental impact analysis	12	12	9	14	9	2	3
		23UESR41	Environmental Studies	8	5	1	7	8	5	5
V	**III**	23UBYC51	**Core Course - IX:** Plant Morphology, Taxonomy and Economic Botany	14	14	14	11	5	11	14
		23UBYC52	**Core Course - X:** Plant Anatomy and Embryology	15	14	15	14	6	10	14
		23UBYC53	**Core Course - XI:** Cell Biology, Genetics and Plant Breeding	15	15	15	14	7	15	13
		23UBYC5P	**Core Course - XII:** Practical: Plant Morphology, Taxonomy And Economic Botany	15	14	14	8	3	10	13

		23UBYC5Q	**Core Course - XIII:** Practical: Plant Anatomy, Embryology, Cell Biology, Genetics and Plant Breeding	14	15	14	15	9	12	14
		23UBYJ51	**Core Course – XIV:** Project with Viva-Voce	15	15	15	10	5	6	5
		23UBYO51 23UBYO52 23UBYO53	**Elective Courses Generic/ Discipline Specific- V:** 1. Bio-Analytical Techniques 2. Aquatic Botany 3. Entrepreneurial Botany	13	11	9	11	9	11	9
		23UBYO54 23UBYO55 23UBYO56	**Elective Courses Generic/ Discipline Specific- VI:** 1. Emerging molecular Techniques 2. Plant Resources and Utilization 3. Prospectives of Medicinal Plants	13	11	12	7	3	4	2
	IV	23UVED51	Value Education	8	5	1	5	9	4	7
		23UBYJ52	Internship / Industrial Training	8	12	4	7	1	5	8
VI	**III**	23UBYC61	**Core Course - XV:** Plant Ecology and Phytogeography	14	14	14	11	15	14	14
		23UBYC62	**Core Course - XVI:** Plant Biotechnology and Molecular Biology	15	15	15	10	12	13	15
		23UBYC63	**Core Course - XVII:** Plant Physiology and Plant Biochemistry	14	14	14	5	10	10	10
		23UBYC6P	**Core Course - XVIII:** Practical: Plant Ecology, Phytogeography, Plant Biotechnology, Molecular Biology, Plant Physiology and Plant Biochemistry	15	15	15	6	12	15	15
		23UBYO61 23UBYO62 23UBYO63	**Elective Courses Generic/ Discipline Specific-VIII:** 1. Horticulture 2. Natural Resource Management 3. Forestry	13	13	12	5	12	13	13

		23UBYO64 23UBYO65 23UBYO66	**Elective Courses Generic/ Discipline Specific-IX:** 1. Bionanotechnology 2. Computer applications in Botany 3. Forensic Botany	13	12	13	5	8	10	11
	IV	23UBYS61 23UBYS62 23UBYS63	**Skill Enhancement Courses –IX: Professional Competency Course:** 1. Botany for Competitive examinations 2. General Studies for Competitive examination 3. Botany for Advanced Studies	12	7	13	6	6	8	10
	V		Extension activity	8	2	1	7	9	8	5
Total Weightage of all courses contributing to PO				**553**	**503**	**399**	**438**	**295**	**287**	**310**

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI

DEPARTMENT OF BOTANY

UG Programme - B.Sc. Botany

CURRICULUM STRUCTURE

OUTCOME-BASED EDUCATION WITH CHOICE BASED CREDIT SYSTEM

(From 2023-2024 Batch onwards)

PROGRAMME ARTICULATION MATRIX (PAM) - WEIGHTED PERCENTAGE OF COURSES CONTRIBUTING TO PO

Semester	Part	Course code	Course Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7
I	I	23UTAG11	Podhu Tamil/Hindi-I	1.81	1.39	0.5	1.83	0.68	0.7	0.97
	II	23UENL11	General English–I	1.81	1.39	0.5	1.83	0.68	0.7	0.97
	III	23UBYC11	**Core Course - I:** Plant Diversity I–Algae	2.71	2.98	3.76	2.74	4.07	3.83	3.55
		23UBYC1P	**Core Course - II:** Practical: Plant Diversity I-Algae	2.71	2.78	3.51	2.97	3.73	3.83	3.55
		23UBYA11	**Elective Course Generic/ Discipline Specific -I:** General and Applied Zoology	2.35	2.58	2.76	2.97	3.73	3.83	3.55
		23UBYA1P	**Elective Course Generic/ Discipline Specific -I:** Practical: General and applied Zoology and Conceptual Zoology	2.17	1.99	2.76	1.83	2.71	2.79	3.55
	IV	23UBYS11	**Skill Enhancement Course - I: Foundation course:** Basic Botany	2.35	2.58	2.51	2.97	2.37	3.83	2.58
		23UBYN11 23UBYN12 23UBYN13	**Skill Enhancement Course - II: Non Major Elective Course :** 1. Organic farming 2. Environmental Biotechnology 3. Nursery and Landscape Management	2.17	2.39	2.26	2.51	2.71	3.83	3.55
II	I	23UTAG21	Podhu Tamil/Hindi-	1.81	1.59	0.5	1.83	0.68	0.7	0.97

			II							
	II	23UENL21	General English–II	1.81	1.59	0.5	1.83	0.68	0.7	0.97
	III	23UBYC21	**Core Course - III:** Plant Diversity II – Fungi, Bacteria, Viruses, Plant pathology and Lichens	2.71	2.78	3.51	2.74	4.07	3.83	3.55
		23UBYC2P	**Core Course - IV:** Practical: Plant Diversity II – Fungi, Bacteria, Viruses, Plant pathology and Lichens	2.53	2.98	3.51	2.51	3.73	3.83	4.52
		23UBYA21	**Elective Course Generic/ Discipline Specific - II** Conceptual Zoology	2.17	1.99	2.76	1.83	2.71	2.79	3.55
		23UBYA2P	**Elective Course Generic/ Discipline Specific -II:** Practical: General and Applied Zoology and Conceptual Zoology	2.17	1.99	2.76	1.83	2.71	2.79	3.55
	IV	23UBYS21	**Skill Enhancement Course – III:** Botanical garden and Landscaping	2.35	2.58	2.51	2.97	2.37	3.83	2.58
		23UBYN21 23UBYN22 23UBYN23	**Skill Enhancement Courses- IV : Non Major Elective Courses:** 1. Mushroom cultivation 2. Herbal Medicine 3. Global Climate change	2.35	1.19	1.25	2.51	0.68	2.79	2.26
III	**I**	23UTAG31	Podhu Tamil/Hindi-III	1.81	1.59	0.5	1.83	0.68	0.7	0.65
	II	23UENL31	General English–III	1.81	1.59	0.75	2.05	1.02	1.05	0.65
	III	23UBYC31	**Core Course - V:** Plant Diversity III - Bryophytes and Pteridophytes	2.71	2.98	3.51	2.74	3.73	1.05	1.61
		23UBYC3P	**Core Course - VI:** Practical: Plant Diversity III- Bryophytes and	2.71	2.98	3.51	3.2	3.73	0.7	1.29

			Pteridophytes							
		23UBYA31	**Elective Course Generic/ Discipline Specific- III:** Chemistry for Biological Sciences – I	2.35	1.99	1.25	0.91	0.68	1.05	0.65
		23UBYA3P	**Elective Course Generic/ Discipline Specific- III:** Practical: Chemistry for Biological Sciences – I	2.35	1.99	1.25	0.46	0.68	1.39	0.97
	IV	23UBYS31	**Skill Enhancement Course - V: (Entrepreneurial Skill)-** Entrepreneurial opportunities in Botany	2.35	2.58	2.26	2.05	3.73	1.05	1.29
		23UBYS32	**Skill Enhancement Course- VI:** Herbal Technology	2.35	2.39	2.76	3.42	5.08	1.39	1.29
		-	Environmental studies	0	0	0	0	0	0	0
IV	**I**	23UTAG41	Podhu Tamil/Hindi-IV	1.81	1.59	0.5	2.05	0.68	0.7	0.65
	II	23UENL41	General English–IV	1.81	1.79	0.75	1.83	0.68	1.05	0.97
	III	23UBYC41	**Core Course - VII:** Plant Diversity IV - Gymnosperms, Paleobotany and Evolution	2.71	2.98	3.51	2.74	3.39	1.39	1.61
		23UBYC4P	**Core Course - VIII:** Practical: Plant Diversity IV - Gymnosperms, Paleobotany and Evolution	2.53	2.78	3.51	2.97	4.41	1.05	0.97
		23UBYA41	**Elective Course Generic/ Discipline Specific- IV:** Chemistry for Biological Sciences – II	2.35	1.99	1.25	0.91	0.68	1.05	0.65
		23UBYA4P	**Elective Course Generic/ Discipline Specific- IV:** Practical: Chemistry for Biological Sciences – II	2.35	2.58	2.51	1.6	0	2.44	2.26

	IV	23UBYS41	**Skill Enhancement Course - VII: Industry Module:** Cultivation of Algae	2.35	2.19	2.01	2.97	2.37	1.39	1.29
		23UBYS42	**Skill Enhancement Course -VIII:** Environmental impact analysis	2.17	2.39	2.26	3.2	3.05	0.7	0.97
		23UESR41	Environmental Studies	1.45	0.99	0.25	1.6	2.71	1.74	1.61
V	**III**	23UBYC51	**Core Course - IX:** Plant Morphology, Taxonomy and Economic Botany	2.53	2.78	3.51	2.51	1.69	3.83	4.52
		23UBYC52	**Core Course - X:** Plant Anatomy and Embryology	2.71	2.78	3.76	3.2	2.03	3.48	4.52
		23UBYC53	**Core Course - XI:** Cell Biology, Genetics and Plant Breeding	2.71	2.98	3.76	3.2	2.37	5.23	4.19
		23UBYC5P	**Core Course - XII:** Practical: Plant Morphology, Taxonomy And Economic Botany	2.71	2.78	3.51	1.83	1.02	3.48	4.19
		23UBYC5Q	**Core Course - XIII:** Practical: Plant Anatomy, Embryology, Cell Biology, Genetics and Plant Breeding	2.53	2.98	3.51	3.42	3.05	4.18	4.52
		23UBYJ51	**Core Course – XIV:** Project with Viva-voce	2.71	2.98	3.76	2.28	1.69	2.09	1.61
		23UBYO51 23UBYO52 23UBYO53	**Elective Courses Generic/ Discipline Specific- V:** 1. Bio-Analytical Techniques 2. Aquatic Botany 3. Entrepreneurial Botany	2.35	2.19	2.26	2.51	3.05	3.83	2.9
		23UBYO54 23UBYO55	**Elective Courses Generic/ Discipline Specific- VI:** 1. Emerging molecular Techniques 2. Plant Resources	2.35	2.19	3.01	1.6	1.02	1.39	0.65

		23UBYO56	and Utilization 3. Prospectives of Medicinal Plants							
	IV	23UVED51	Value Education	1.45	0.99	0.25	1.14	3.05	1.39	2.26
		23UBYJ52	Internship/ Industrial Training	1.45	2.39	1	1.6	0.34	1.74	2.58
VI	**III**	23UBYC61	**Core Course - XV:** Plant Ecology and Phytogeography	2.53	2.78	3.51	2.51	5.08	4.88	4.52
		23UBYC62	**Core Course - XVI:** Plant Biotechnology and Molecular Biology	2.71	2.98	3.76	2.28	4.07	4.53	4.84
		23UBYC63	**Core Course - XVII:** Plant Physiology and Plant Biochemistry	2.53	2.78	3.51	1.14	3.39	3.48	3.23
		23UBYC6P	**Core Course - XVIII:** Practical: Plant Ecology, Phytogeography, Plant Biotechnology, Molecular Biology, Plant Physiology and Plant Biochemistry	2.71	2.98	3.76	1.37	4.07	5.23	4.84
		23UBYO61 23UBYO62 23UBYO63	**Elective Courses Generic/ Discipline Specific-VIII:** 1. Horticulture 2. Natural Resource Management 3. Forestry	2.35	2.58	3.01	1.14	4.07	4.53	4.19
		23UBYO64 23UBYO65 23UBYO66	**Elective Courses Generic/ Discipline Specific-IX:** 1.Bionanotechnology 2. Computer applications in Botany 3. Forensic Botany	2.35	2.39	3.26	1.14	2.71	3.48	3.55
	IV	23UBYS61 23UBYS62	**Skill Enhancement Courses –IX: Professional Competency Course:** 1. Botany for Competitive examinations 2. General Studies for Competitive	2.17	1.39	3.26	1.37	2.03	2.79	3.23

		23UBYS63	examination 3.Botany for Advanced Studies							
	V		Extension activity	1.45	0.4	0.25	1.6	3.05	2.79	1.61
Total Weighted percentage of Course contribution to POs				100	100	100	100	100	100	100

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF TAMIL
UG PROGRAMME - B.A./ B.COM/B.B.A./ B.Sc./BCA
SEMESTER - I
பொதுத்தமிழ் - I (23UTAG11)
(From 2023-2024 Batch onwards)

HOURS / WEEK : 6 **INT. MARKS: 25**
CREDITS : 3 **EXT. MARKS:75**
DURATION : 90 hrs **MAX. MARKS: 100**

நோக்கங்கள்

- முதலாமாண்டு பட்ட வகுப்பு மாணவர்களுக்குத் தமிழ் மொழி இலக்கியங்களை அறிமுகம் செய்தல்.
- தற்கால இலக்கியப் போக்குகளையும் இலக்கணங்களையும் மாணவர் அறியுமாறு செய்து அவர்களின் படைப்பாற்றலைத் தூண்டுதல்.
- தமிழ் இலக்கியம் சார்ந்த போட்டித் தேர்வுகளுக்கு ஏற்ப கற்பித்தல் நடைமுறைகளை மேற்கொள்ளுதல்.

கற்றலின் விளைவுகள்

CO1[K1]: பாரதியார் காலந்தொட்டு தற்காலக் கவிதைகள் வரை கவிதை இலக்கியம் அறிமுகப்படுத்தப்படுவதால் அவற்றை அடையாளம் காண்பர்.

CO2[K2]: கவிதை வரலாற்றினை புரிந்து கொண்டு பிழை இல்லாமல் எழுதும் திறன் பெறுவர்.

CO3[K3]: இக்கால இலக்கிய வகைகள் மற்றும் இலக்கணம் கற்பதன் மூலம் அவற்றை தம் வாழ்நிலையோடு பொருத்திப் பார்ப்பர்.

CO4[K4]: மொழியறிவோடு சிந்தனைத்திறன் பெற்று இலக்கியம் மற்றும் இலக்கணங்களைப்பகுப்பாய்வர்.

CO5[K5]: உலகளாவிய இலக்கியங்களைக் கற்று மதிப்பீடு செய்வர்.

CO/PO Mapping Table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K1]	2	2	-	2	-	-	-
CO2[K2]	2	2	-	2	-	-	-
CO3[K3]	2	1	-	2	1	-	1
CO4[K4]	2	1	1	1	1	1	1
CO5[K5]	2	1	1	1	-	1	1
Weightage of the Course	10	07	02	08	02	02	03
Weighted percentage of Course Contribution to POs	**1.81**	**1.39**	**0.5**	**1.83**	**0.68**	**0.7**	**0.97**

Based on the Level of Contribution ('3' -High, '2' -Medium, '1' -Low, '-' No Correlation)

கூறு I **(18 hrs)**

மரபுக்கவிதை: பெ.சுந்தரனார் - தமிழ்த் தெய்வ வணக்கம், பாரதிதாசன் - சிறுத்தையை வெளியில் வா, கவிமணி - புத்தரும் சிறுவனும், முடியரசன் - மொழி உணர்ச்சி, கண்ணதாசன் - ஆட்டனத்தி ஆதிமந்தி - ஆதிமந்திபுலம்பல், சுரதா - துறைமுகம் தொகுப்பிலிருந்து ஏதேனும் ஒருகவிதை, தமிழ் ஒளி - கடல்

கூறு II **(18 hrs)**

புதுக்கவிதை: அப்துல் ரகுமான் - வீட்டுக்கொருமரம் வளர்ப்போம், ஈரோடு தமிழன்பன் - சென்ரியூ கவிதைகள் (ஏதேனும் ஐந்து கவிதைகள்), வைரமுத்து - பிற்சேர்க்கை, மு.மேத்தா - வாழைமரம், அறிவுமதி - வள்ளுவம் பத்து, நா முத்துக்குமார் - ஆனந்தயாழை மீட்டுகிறாய், சுகிர்தராணி - சபிக்கப்பட்ட முத்தம், இளம் பிறை - நீ எழுத மறுக்கும் எனது அழகு.

கூறு III **(18 hrs)**

சிறுகதைகள் : வாய்ச்சொற்கள் - ஜெயகாந்தன் (மாலைமயக்கம் தொகுப்பு), கடிதம் - புதுமைப்பித்தன், கரு - உமாமகேஸ்வரி, முள்முடி - தி.ஜானகிராமன், சிதறல்கள் - விழி.பா.இதயவேந்தன், காகிதஉறவு - சு.சமுத்திரம், வீட்டின் மூலையில் சமையல் அறை - அம்பை, (மொழிபெயர்ப்புக் கதை) ஆண்டன் செக்காவ் - நாய்க்காரச் சீமாட்டி, சந்தியா பதிப்பகம்.

கூறு IV **(18 hrs)**

மரபுக்கவிதை கவிதை தோற்றம் வளர்ச்சி - புதுக்கவிதை கவிதை தோற்றம் வளர்ச்சி - சிறுகதை தோற்றம் வளர்ச்சி

கூறு V **(18 hrs)**

மொழித்திறன் போட்டிதேர்வு: பொருள் பொதிந்த சொற்றொடர் அமைத்தல், ஓர் எழுத்து ஒருமொழி, வேற்றுமை உருபுகள், திணை, பால், எண், இடம், கலைச்சொல்லாக்கம், மொழிபெயர்ப்பு.
(குறிப்பு: அலகு 4, 5 ஆகியன போட்டித் தேர்வு நோக்கில் நடத்தப்பட வேண்டும்).

பாடநூல்கள்

1. தமிழியல் துறையினர், *தொகுப்பு நூல்,* ஸ்ரீ காளீஸ்வரி கல்லூரி (தன்னாட்சி), சிவகாசி.
2. வாசுதேவன், கா. *பன்முக நோக்கில் தமிழ் இலக்கிய வரலாறு,* தேவன் பதிப்பகம், திருச்சிராப்பள்ளி, 2017.

பார்வை நூல்கள்

1. சிற்பி. பாலசுப்பிரமணியன், *தமிழ் இலக்கிய வரலாறு,* கவிதா வெளியீடு, சென்னை.
2. தமிழண்ணல், *புதிய நோக்கில் தமிழ் இலக்கிய வரலாறு,* சோலை பதிப்பகம், மதுரை
3. பாக்கியமேரி, *வகைமை நோக்கில் தமிழ் இலக்கிய வரலாறு,* பாரி நிலையம், சென்னை.

வலைப்பதிவுகள் (Web Sources)

1. Tamil Heritage Foundation- www.tamilheritage.org <http://www.tamilheritage.org>
2. Tamil virtual University Library- www.tamilvu.org/ library http://www.virtualvu.org/library

3. Project Madurai - www.projectmadurai.org.
4. Chennai Library- www.chennailibrary.com <http://www.chennailibrary.com>.
5. Tamil Universal Digital Library- www.ulib.prg <http://www.ulib.prg>.
6. Tamil E-Books Downloads- tamilebooksdownloads. blogspot.com
7. Tamil Books on line- books.tamil cube.com
8. Catalogue of the Tamil books in the Library of British Congress archive.org
9. Tamil novels on line - books.tamilcube.com

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF ENGLISH
UG PROGRAMME - B.A./ B.COM/B.B.A./ B.Sc./BCA
SEMESTER- I
GENERAL ENGLISH-I (23UENL11)
(From 2023-2024 Batch onwards)

HOURS/WEEK: 6 (L-5, T-1) **INT. MARKS: 25**
CREDITS : 3 **EXT. MARKS: 75**
DURATION : 90 hrs **MAX. MARKS: 100**

Course Objectives

- To enable learners to acquire the linguistic competence necessarily required in various life situations.
- To help them understand the written text and able to use skimming, scanning skills
- To assist them in creative thinking abilities.
- To enable them become better readers and writers.
- To assist them in developing correct reading habits, silently, extensively and intensively.

Course Outcomes (CO)

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

CO1[K1]: identify the use of the language skills i.e. Reading, Listening, Speaking and Writing

CO2[K2]: demonstrate communicative skills by articulating simple dialogues and instructions

CO3[K3]: apply knowledge of word power and grammar in framing correct sentences

CO4[K4]: analyze prose, poetry and short stories to develop language skills through literature

CO5[K5]: assess the linguistic competence that enables them, in the future, to present their views in various social, academic and employment situations

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K1]	2	2	-	2	-	-	-
CO2[K2]	2	2	-	2	-	-	-
CO3[K3]	2	1	-	2	1	-	1
CO4[K4]	2	1	1	1	1	1	1
CO5[K5]	2	1	1	1	-	1	1
Weightage of the course	10	07	02	08	02	02	03
Weighted percentage of Course contribution to POs	**1.81**	**1.39**	**0.5**	**1.83**	**0.68**	**0.7**	**0.97**

Based on the level of contribution ('3'-High, '2'-Medium, '1'-Low '-' No Correlation)

UNIT I - PROSE **(18 hrs)**

Jerome K Jerome	–	Uncle Podger Hangs a Picture
David Sedaris	–	Us and Them -From Dress Your Family in Corduroy and Denim
Harish Bhat	–	JRD

UNIT II - POETRY **(18 hrs)**

William Ralph Emerson	–	A Nation's Strength
Paul Laurence Dunbar	–	The Sparrow
Subramania Bharati	–	A Patch of Land
Chinua Achebe	–	Love Cycle

UNIT III - SHORT STORIES **(18 hrs)**

Bhabani Bhattacharya	–	The Faltering Pendulum
R.K. Laxman	–	The Gold Frame
Sudha Murthy	–	How I Taught My Grandmother to Read

UNIT IV - LANGUAGE COMPETENCY **(18 hrs)**

Vocabulary: Synonyms, Antonyms, Word Formation
Appropriate use of Articles and Parts of speech
Error Correction

UNIT V - ENGLISH FOR WORKPLACE **(18 hrs)**

Self-Introduction, Greetings
Introducing others
Listening for General and Specific Information
Listening to and Giving Instructions/Directions

TEXTBOOKS

1. Bhattacharya, Bhabani. *Steel Hawk and other stories*. New Delhi: Sahitya Akademi, 1967.
2. Sudha, Murthy. *How I Taught My Grandmother to Read and other Stories*, India: Penguin Books, 2004.

REFERENCES

Books

1. Kumar, Vijay T & K Durga Bhavani. *English in use -A Textbook for College Students.* YL Srinivas
2. Swan, Michael. *Practical English Usage* - 4th Edition. New York: Oxford University Press, 2016.
3. Shepherd Margaret & Sharon Hogan. Penny Carter (Illustrator). *The Art of Civilized Conversation: A Guide to Expressing Yourself with Style and Grace.* Now York: Broadway Books, 2005.

Web Sources

1. https://books.google.co.in/books?id=iSHvOmXuvLMC&printsec=frontcover&dq=subramania+bharati+poems&hl=en&newbks=1&newbks_redir=0

&source=gb_mobile_search&sa=X&redir_esc=y#v=onepage&q=subramania%20bharati%20poems&f=false
2. https://poets.org/poem/sparrow-0
3. https://poets.org/poem/nations-strength
4. https://www.best-poems.net/chinua-achebe/love-cycle.html
5. https://www.tata.com/newsroom/heritage/coffee-tea-jrd-tata-stories
6. https://legacy.npr.org/programs/morning/features/2004/jun/sedaris/usandthem.html
7. http://rosyhunt.blogspot.com/2013/01/uncle-podger-hangs-picture.html
8. https://fybaenglish.blogspot.com/2018/12/the-gold-frame-r-k-laxman.html

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF BOTANY
UG Programme – B.Sc. Botany
SEMESTER – I
CORE COURSE – I: PLANT DIVERSITY I - ALGAE (23UBYC11)
(From 2023-2024 Batch onwards)

HOURS/WEEK: 4 (L-3, T-1) **INT. MARKS:25**
CREDITS : 4 **EXT. MARKS: 75**
DURATION : 60 hrs **MAX. MARKS:100**

Course Objectives

- To develop skills to identify algae based on habitat, thallus structure and the internal organization.
- To identify the algae and its importance.
- To develop skills to prepare the microslides of algae.
- To study the economic importance of algal species.
- To understand the importance of algae to animals and humans.

Course Outcomes (CO)

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

CO1[K1]: state the structural organization, reproduction and significance of algae

CO2[K2]: illustrate the knowledge in understanding the various life cycle patterns and the fundamental concepts in algal growth

CO3[K3]: outline the benefits of various algal technologies on the ecosystem.

CO4[K4]: examine the thallus organization and modes of reproduction in Algae

CO5[K5]: determine the emerging areas of Algal Biotechnology for identifying commercial potentials of algal products and their uses

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K1]	3	3	3	3	2	1	2
CO2[K2]	3	3	3	2	3	3	2
CO3[K3]	3	3	3	1	2	2	1
CO4[K4]	3	3	3	3	3	2	3
CO5[K5]	3	3	3	3	2	3	3
Weightage of the Course	**15**	**15**	**15**	**12**	**12**	**11**	**11**
Weighted percentage of course contribution to POs	**2.71**	**2.98**	**3.76**	**2.74**	**4.07**	**3.83**	**3.55**

Based on the level of contribution ('3'- Strong, '2'-Medium, '1'-Low '-' No Correlation)

UNIT I **(12 hrs)**

ALGAE: General Characters of Algae- Nutrition – Reproduction in Algae – Life Cycle Pattern –Outline Classification of Fritsch (1935-1945) – criteria for classification – algal distribution. Economic Importance of Algae.

UNIT II **(12 hrs)**

Brief account on Freshwater algae –Marine algae – Terrestrial algae – Symbiotic algae – Parasitic algae. Distribution, Structure, Reproduction and Life Cycle of the Following: Thallus organization–Unicellular. Chlorellales-*Chlorella,* Bacillariales –Diatoms. Colonial- Chlamydomonodales- *Volvox*; Filamentous- Nostocales *-Anabaena, Oedogoniales-Oedogonium;* Siphonous- Bryopsidales-*Caulerpa*, Parenchymatous- Fucalus-*Sargassum,* Gracilariales-*Gracilaria.*

UNIT III **(12 hrs)**

Reproduction-Vegetative, asexual, sexual reproduction and life histories-Haplontic-, *Oedogonium* and *Chara*, Diplontic-Diatoms and *Sargassum,* Diplohaplontic-*Ulva* and diplobiontic-*Gracilaria*- Examples may be changed according to the availability of the specimens.

UNIT IV **(12 hrs)**

Algal cultivation methods- Algal production systems- Indoor cultivation methods and large-Scale cultivation of algae- Harvesting of algae- preservation and processing methods of algae.

UNIT V **(12 hrs)**

Algae as food and feed: Agar-agar, Alginic acid and Carrageenan; Diatomite- Resource potential of algae- Application of algae as fuel, agriculture and pharmaceutical- Phycoremediation- Role of algae in CO_2 sequestration, Algae as indicator of water pollution, algal bioinoculants, Bioluminescence.

TEXTBOOKS

1. Dehradun .Edwardlee, R.Phycology, 5thEd., Cambridge University Press, London, 2018.
2. Kumar, H.D. Introductory Phycology. Affiliated East-WestPress,Delhi,1999.
3. Singh, Pandey and Jain. A text book of Botany, 5th Edition, Rastogi Publication, Meerut, 2020.
4. Vashishta, P.C. S.Chand & Company Ltd, New Delhi, 2014.
5. Ian Morris. An introduction to the algae. Hutchinson & Co (Publishers) Ltd. London, 1977.

REFERENCES

Books

1. Aziz, F and Rasheed, R. A Course Book of Algae. Publisher: University of Sulaimani.ISBN: 978-9922-20-391-1, 2019.
2. Mihir Kumar, D. Algal Biotechnology. Daya Publishing House, New Delhi, 2010.
3. Chapman V.J. and Chapman D.J.The Algae. Alpha Numera, 2013.
4. Fritsch, F.E. Structure and reproduction of Algae. Cambridge University press, 1945.
5. Round, F.E. The Ecology of Algae. Cambridge University Press, 1984.
6. Lee, R.D. Phycology 4th Edition, Cambridge University Press, New York, 2008.
7. Bold, H.C and Wynne, M.J. Introduction to the Algae: Structure and Function. Prantice Hall of India New Delhi, 1978.

Web Sources

1. https://www.crcpress.com/Therapeutic-and-Nutritional-Uses-of Algae/Pereira/p/book/9781498755382
2. https://www.crcpress.com/Algae-Anatomy-Biochemistry-and-Biotechnology-Second-Edition/Barsanti Gualtieri/p/book/9781439867327
3. https://www.crcpress.com/Marine-Algae-Biodiversity-Taxonomy-Environmental-Assessment-and-Biotechnology/Pereira-Neto/p/book/9781466581678
4. https://www.kopykitab.com/Botany-For-Degree-Students-ALGAE-by-B-R-Vashishta-Dr-A-K-Sinha-Dr-V-P-Singh
5. https://www.wileyindia.com/a-textbook-of-algae.html
6. https://www.kobo.com/in/en/ebook/algae-biotechnology
7. https://www.ikbooks.com/books/book/life-sciences/botany/a-textbook-algae/9788188237449/

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF BOTANY
UG Programme – B.Sc. Botany
SEMESTER – I
CORE COURSE – II: PRACTICAL: PLANT DIVERSITY I - ALGAE (23UBYC1P)
(From 2023-2024 Batch onwards)

HOURS/WEEK: 4 **INT. MARKS: 25**
CREDITS : 4 **EXT. MARKS: 75**
DURATION : 60 hrs **MAX. MARK: 100**

Course Objectives

- To describe the common characteristics of fungi as being heterotrophic, unicellular/multicellular.
- To understand the biology of fungi and to discuss the importance of fungi in various ecological roles.
- To understand lichen structure, function, identification, and ecology; Comprehend the events of symbiosis and lichenization and to demonstrate the use of lichens as bioindicator species.
- To identify the main groups of plant pathogens, their symptoms.
- To understand the various types of plant diseases.

Course Outcomes (CO)

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

CO1[K2]: examine the algae using key identification characters

CO2[K3]: develop the practical skills in preparation of fresh mount and identification of algal forms from algal mixture

CO3[K4]: outline the internal structure of algae prescribed in the syllabus

CO4[K5]: measure the algal diversity in fresh/marine water and their economic significance

CO5[K6]: predict the various techniques used for algal culture for commercial purposes

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K2]	3	3	3	3	2	1	2
CO2[K3]	3	3	3	2	3	3	2
CO3[K4]	3	2	2	3	1	2	1
CO4[K5]	3	3	3	3	3	2	3
CO5[K6]	3	3	3	2	2	3	3
Weightage of the course	**15**	**14**	**14**	**13**	**11**	**11**	**11**

Weighted percentage of course contribution to POs	**2.71**	**2.78**	**3.51**	**2.97**	**3.73**	**3.83**	**3.55**

Based on the level of contribution ('3'- Strong, '2'-Medium, '1'-Low '-' No Correlation)

Micro Preparations, Observations, Identification and mounting the slides for Vegetative part of the following Specimens:

EXPERIMENTS

1. Micro-preparation of the types prescribed for available algae species.
2. Identifying the micro slides relevant to the syllabus.
3. Identifying types of algal mixture.
4. Economic importance of Algae as: (i) Food (ii) Feed (iii) Biofertilizers (iv) Seaweed liquid fertilizer (v) Hydrogen production by algae (vi) SCP (vii) Agar Agar (viii) Alginate (ix) Diatomaceous earth.
5. Field visit to study fresh water/marine water algal habitats.
6. Visit to nearby industry actively engaged in algal technology.
7. Herbarium preparation techniques
8. Herbarium submission

TEXTBOOKS

1. Kumar, H.D. *Introductory Phycology*. Affiliated East-WestPress,Delhi. 1999.
2. Bendre, M.Ashok and Ashok Kumar,A. *Text Book of Practical Botany*-1(10thed). Rastogi Publications, Meerut. 2020.
3. Round, FE. The Ecology of Algae. Cambridge University Press. 1984.
4. Aziz, F and Rasheed, R. A *Course Book of Algae*. Publisher: University of Sulaimani.ISBN: 978-9922-20-391-1. 2019.
5. Singh, Pandey and Jain. *A text book of Botany*, 5th Edition, Rastogi Publication, Meerut. 2020.

REFERENCES

Books

1. Nancy Serediak and M. Huynh. *Algae identification lab Guide*. *Accompanying manual to algae identification field guide*. Ottawa Agriculture and Agri food Canada publisher. 2011.
2. Chapman, V.J and Chapaman, D.J. *The Algae*, ELBS & MacMillan, London. 1960.
3. Lee, R.D. *Phycology* 4th Edition, Cambridge University Press, New York. 2008.
4. Dehradun. Edwardlee,R. *Phycology*, 5thEd., CambridgeUniversityPress, London. 2018.

Web Sources

1. https://www.amazon.in/Practical-Manual-Algae-Sundara-Rajan/dp/8126106492
2. https://books.google.co.in/books/about/Practical_Manual_of_Algae.html?id=8d5DAAAACAAJ&redir_esc=
3. https://freebookcentre.net/biology-books-download/Concepts-of-Botany-Algae-(PDF-21P).html
4. https://www.ebooks.com/en-in/book/210152662/algae/sachin-kumar-mandotra/
5. https:/books.google.co.in/books/about/Algae.html?id=s1P855ZWc0kC&redir_esc=y

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF BOTANY
UG Programme – B.Sc. Botany
SEMESTER – I
ELECTIVE COURSE GENERIC/DISCIPLINE SPECIFIC - I: GENERAL AND APPLIED ZOOLOGY (23UBYA11)
(From 2023-2024 Batch onwards)

HOURS/WEEK: 4 **INT. MARKS: 25**
CREDITS : 3 **EXT. MARKS: 75**
DURATION : 60 hrs **MAX. MARK: 100**

Course Objectives

- To give a preliminary knowledge on animal diversity and structural organization of animals.
- To enlighten the students about the diverse forms of Invertebrate and Vertebrate animals present around us.
- To help our students to distinguish various animals and to know the evolutionary sequence of them.

Course Outcomes (CO)

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

CO1[K1]: describe the classification of animal kingdom

CO2[K2]: explain the lifecycle of Non chordates

CO3[K3]: describe the taxonomic position and importance of animal diversity

CO4[K4]: outline the morphological characters of insects that are beneficial to marcherial

CO5[K5]: discuss the uses of edible fishes and poultry

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K1]	3	3	1	3	2	1	2
CO2[K2]	3	3	2	2	3	3	2
CO3[K3]	2	2	3	3	1	2	1
CO4[K4]	3	2	3	3	3	2	3
CO5[K5]	2	3	2	2	2	3	3
Weightage of the course	**13**	**13**	**11**	**13**	**11**	**11**	**11**
Weighted percentage of course contribution to POs	**2.35**	**2.58**	**2.76**	**2.97**	**3.73**	**3.83**	**3.55**

Based on the level of contribution ('3'- Strong, '2'-Medium, '1'-Low '-' No Correlation)

UNIT I **(12 hrs)**

1. General classification of animal kingdom.
2. Unicellular, multicellular, radiate, bilateria, acoelomate, pseudocoelomata, coelomate.
3. Classification of invertebrata with Indian examples.
4. Outline classification of Phylum Chordata – Primary & Secondary Character

UNIT II **(12hrs)**

1. Malarial parasite – Types & Life cycle – prevention & control.
2. Corals & its importance.
3. Ascaris & Filarial worm Life cycle.

UNIT III **(12 hrs)**

1. Insect pests [Paddy & Coconut] – Reasons for outbreak & control.
2. Beneficial insect – Silkworm.
3. Vermiculture & Apiculture

UNIT IV **(12 hrs)**

1. Local food fishes – identification and food value of any 3 edible fishes.
2. Snakes – identification, venom & its action – biting mechanism – first aid – poisonous & non- poisonous snakes any 2 for each.

UNIT V **(12 hrs)**

1. Poultry & its economic importance.
2. Animal husbandry & its economic importance.
3. Rearing of pig & its economic importance.

TEXTBOOKS

1. Ekambaranatha Ayyar & T.N.Ananthakrishnan. *Manual of Zoology Vol – I*, Part I & II S.Viswanathan Pvt. Ltd. Chennai. 1992.
2. Jordan.E.L & Verma.P.S. *Invertebrate Zoology* S.Chand & Co. New Delhi. 2001.
3. Ekambaranatha Ayyar & T.N.Ananthakrishnan *Manual of Zoology Vol – I,* Part I & II S.Viswanathan Pvt. Ltd. Chennai. 1992.
4. Jordan.E.L & Verma.P.S. S. *Chordate Zoology*. Chand & Co. New Delhi. 2003.

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF BOTANY
UG Programme – B.Sc. Botany
SEMESTER – I
ELECTIVE COURSE GENERIC/DISCIPLINE SPECIFIC - I: PRACTICAL: GENERAL AND APPLIED ZOOLOGY (23UBYA1P)
(From 2023-2024 Batch onwards)

HOURS/WEEK: 2 **INT. MARKS: 25**
CREDITS : 2 **EXT. MARKS: 75**
DURATION : 30 hrs **MAX. MARK: 100**

Course Objectives

- To Learn and be familiar with the Laboratory techniques.
- To understand the taxonomic position, body organization and evolutionary relationship of animals. To inculcate the significance of various non-chordates and chordates.

Course Outcomes (CO)

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

CO1[K2]: examine the familiar with practical skills in the use of tools, technologies and methods common to microbiology and physiology

CO2[K3]: apply knowledge and come to know how to handle different organisms

CO3[K4]: analyze and to observe various specimens by using Microscope

CO4[K5]: survey the animal diversity in fresh and marine habitats

CO5[K6]: evaluate the various techniques used for Blood group testing purposes

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K2]	3	3	1	3	2	1	2
CO2[K3]	3	2	2	2	2	2	2
CO3[K4]	2	2	3	1	1	2	1
CO4[K5]	2	2	3	1	2	2	3
CO5[K6]	2	1	2	1	1	1	3
Weightage of the course	**12**	**10**	**11**	**08**	**08**	**08**	**11**
Weighted percentage of course contribution to POs	**2.17**	**1.99**	**2.76**	**1.83**	**2.71**	**2.79**	**3.55**

Based on the level of contribution ('3'- Strong, '2'-Medium, '1'-Low '-' No Correlation)

SPOTTERS (OR) MUSEUM SPECIMENS:

INVERTEBRATA:

1. Plasmodium
2. Corals
3. Ascaris male & female
4. Filarial worm
5. Paddy pest
6. Coconut pest
7. Apis
8. Silk worm

CHORDATA

1. Any 3 three edible fishes.
2. Any 2 poisonous snakes.
3. Any 2 non-poisonous snakes.
4. Unit 5 related spotters.

TEXTBOOKS

1. Ekambaranatha Ayyar & T.N.Ananthakrishnan. *Manual of Zoology Vol – I*, Part I & II S.Viswanathan Pvt. Ltd. Chennai. 1992.
2. Jordan.E.L & Verma.P.S. *Invertebrate Zoology* S.Chand & Co. New Delhi. 2001.
3. Ekambaranatha Ayyar & T.N.Ananthakrishnan *Manual of Zoology Vol – I,* Part I & II S.Viswanathan Pvt. Ltd. Chennai. 1992.
4. Jordan.E.L & Verma.P.S. S. *Chordate Zoology*. Chand & Co. New Delhi. 2003.

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI

DEPARTMENT OF BOTANY

UG Programme – B.Sc. Botany

SEMESTER – I

SKILL ENHANCEMENT COURSE – I: FOUNDATION COURSE - BASIC BOTANY

(23UBYS11)

(From 2023 - 2024 Batch onwards)

HOURS/WEEK: 2 **INT. MARKS: 25**

CREDITS : 2 **EXT. MARKS: 75**

DURATION : 30 hrs **MAX. MARKS: 100**

Course Objectives

- To learn about the classification, distinguishing traits, geographic distribution, and reproductive cycle of algae, fungi, lichens, and bryophytes.
- To understand the biodiversity by describing and explaining the morphology and reproductive processes of algae, fungi, bryophytes and microorganisms.
- To investigate the classification, distinctive traits, distribution and reproduction, life history of Pteridophytes and Gymnosperms.
- To learn various cell structures and functions of prokaryotes and eukaryotes and understand the salient features and functions of cellular organelles.
- To understand the laws of inheritance, genetic basis of loci and alleles.

Course Outcomes (CO)

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

CO1[K1]: relate the awareness and appreciation of human friendly algae and their economic importance

CO2[K2]: illustrate an understanding of microbes and fungi and appreciate their adaptive strategies

CO3[K3]: articulate on the morphology, anatomy and reproduction of Bryophytes, Pteridophytes and Gymnosperms

CO4[K4]: compare the structure and function of cells and explain the development of cells

CO5[K5]: inspect the core concepts and fundamentals of plant biotechnology and genetic engineering

CO-PO Mapping table (Course Articulative Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K1]	3	3	1	3	2	1	1
CO2[K2]	3	3	2	2	1	3	2
CO3[K3]	2	2	3	2	1	2	1
CO4[K4]	2	3	2	3	1	2	3
CO5[K5]	3	2	2	3	2	3	1
Weightage	**13**	**13**	**10**	**13**	**07**	**11**	**08**

of the course							
Weighted percentage of course contribution to POs	**2.35**	**2.58**	**2.51**	**2.97**	**2.37**	**3.83**	**2.58**

Based on the level of contribution ('3'-Strong, '2'-Medium, '1'-Low '-' No Correlation)

UNIT I- BIODIVERSITY (6 hrs)

Systematics: Two Kingdom and Five Kingdom systems - Salient features of various Plant Groups: Algae- Fungi- Bryophytes- Pteridophytes and Gymnosperms- Viruses - Bacteria.

UNIT II- CELL BIOLOGY (6 hrs)

Cell as the basic unit of life - Prokaryotic and Eukaryotic Cell (Plant Cell)- Light Microscope and Electron Microscope Ultra Structure of Prokaryotic and Eukaryotic Cells - Cell Wall - Cell Membrane Plastids- Ribosomes.

UNIT III- PLANT MORPHOLOGY (6 hrs)

Structure and Modification of Root- Stem and Leaf - Structure and Types of Inflorescences - Structure and Types of Flowers- Fruits and Seeds.

UNIT IV- GENETICS (6 hrs)

Concept of Heredity and Variation - Mendel's Laws of Inheritance.

UNIT V- PLANT PHYSIOLOGY (6 hrs)

Cell as a Physiological Unit- Water relations-Absorption and movement-Diffusion-Osmosis-Plasmolysis-Imbibition-Permeability-Water Potential-Transpiration - Movement - Mineral Nutrition.

TEXTBOOKS

1. Singh, V., Pande, P.C and Jain, D.K. *A Text Book of Botany*. Rastogi Publications,Meerut. 2021.
2. Bhatnagar, S.P and Alok Moitra. *Gymnosperm*s, New Age International (P) Ltd., Publishers, Bengaluru. 2020.
3. Sharma, O.P. *Bryophyta*, MacMillan India Ltd. Delhi. 2017.
4. Lee, R.E. 2008. *Phycology, IV Edition*, Cambridge University Press, New Delhi.
5. Pandey B.P. *Text Book of Botany* (College Botany) Vol I and II, S.Chand and Co. New Delhi. 1986.
6. Rao, K., Krishnamurthy, K.V and Rao, G.S. *Ancillary Botany*. S. Viswanathan Pvt. Ltd., Madras. 1979.

REFERENCES

Books

1. Parihar, N.S. *An introduction to Embryophyta –Pteridophytes* - Surjeet Publications, Delhi. 2012.
2. Alexopoulos, C.J. *Introduction to Mycology*. Willey Eastern Pvt. Ltd. 2013.
3. Vashishta, P.C. *Botany for Degree Students Gymnosperms*. Chand & Company Ltd, Delhi. 2014.
4. Coulter, M. Jhon, *Morphology of Gymnosperms*. Surjeet Publications, Delhi. 2014.
5. Vashishta, P.C. *Botany for Degree Students Algae*. 2014. Chand & Company Ltd, Delhi. 2014.
6. Parihar, N.S. *An introduction to Embryophyta –Bryophytes*. Surjeet Publications, Delhi. 2013.

Web Sources

1. https://www.kobo.com/us/en/ebook/the-algae-world
2. http://www.freebookcentre.net/biology-books-download/Fungi-(PDF-15P).html
3. http://scitec.uwichill.edu.bb/bcs/bl14apl/bryo1.htm
4. https://www.toppr.com/guides/biology/plant-kingdom/pteridophytes/
5. https://arboretum.harvard.edu/wp-content/uploads/2013-70-4-beyond-pine-cones-an-introduction-to-gymnosperms.pdf
6. https://www.us.elsevierhealth.com/medicine/cell-biology
7. https://www.us.elsevierhealth.com/medicine/genetics
8. https://www.kobo.com/us/en/ebook/plant-biotechnology-1

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF BOTANY
UG Programme – B.Sc. Botany
SEMESTER - I
SKILL ENHANCEMENT COURSE - II: NON-MAJOR ELECTIVE COURSE:
ORGANIC FARMING (23UBYN11)
(From 2023 - 2024 Batch onwards)

HOURS/WEEK: 2 **INT. MARKS: 25**
CREDITS : 2 **EXT. MARKS: 75**
DURATION : 30 hrs **MAX.MARKS: 100**

Course Objectives

- To enable students to gain knowledge on the scope of organic farming and its significance.
- To impart practical insights sustainable agriculture, green manuring, recycling and composting.
- To understand the physical and chemical properties of soil.
- To study sustainable agriculture.
- To know about the importance of biofertilizers.

Course Outcomes (CO)

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

CO1[K1]: recognize the different forms of biofertilizers and their uses
CO2[K2]: explain and interpret the components, patterns, and processes of bacteria for growth in crop production
CO3[K3]: apply techniques for synthesizing green manure and develop strategies to increase crop yield
CO4[K4]: analyze and decipher the significance of biofertilizers in soil fertility
CO5[K5]: develop a new strategies to enhance growth and quality check of medicinal herbs considering the practical issues pertinent to India

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K1]	3	2	1	3	2	1	2
CO2[K2]	3	3	2	1	2	3	2
CO3[K3]	2	2	3	3	1	2	2
CO4[K4]	2	2	1	1	2	3	2
CO5[K5]	2	3	2	3	1	2	3
Weightage of the	**12**	**12**	**9**	**11**	**8**	**11**	**11**

course							
Weighted percentage of course contribution to POs	**2.17**	**2.39**	**2.26**	**2.51**	**2.71**	**3.83**	**3.55**

Based on the level of contribution ('3'-Strong, '2'-Medium, '1'-Low '-' No Correlation)

UNIT I (6 hrs)

Soil – physical and chemical properties- Soil pollution – oil-chemicals – fertilizers- pesticide and herbicide- non-degradable solids- biomagnification, consequences of land pollution – damage to soil and crops.

UNIT II (6 hrs)

Organic farming – definition- basic concept of organic farming- integrated plant nutrient supply management- integrated insect pest and disease management- integrated soil and water management- Sustainable agriculture practices-crop rotation- mixed cropping.

UNIT III (6 hrs)

Management of organic wastes and green manures- Farm manures- Composts- Mulches and pest control- importance of organic manure- importance of green manure- crops of green manure- oil cake, Animal based organic manure–cow dung- vermicompost-methods- production - utilization.

UNIT IV – (6 hrs)

Biofertilizers–classification- nitrogen fixers–*Rhizobium*, Cyanobacteria-*Azolla* Vesicular and Arbuscular-Mycorrhiza.

UNIT V (6 hrs)

Recycling of bio-degradable municipal - agricultural and Industrial wastes – biocompost making methods.

TEXTBOOKS

1. NIIR Board. *The complete Technology Book on Biofertilizer and organic farming. 2nd Edition.* NIIR Project Consultancy Services, 2012.
2. Sathe, T.V. *Vermiculture and Organic Farming*. Daya publishers, 2004.
3. Subba Rao N.S. *Biofertilizers in Agriculture and Forestry*. Fourth Edition. Medtech, 2017.
4. Vayas,S.C, Vayas, S. and Modi, H.A. *Bio-fertilizers and organic Farming*. Akta Prakashan, Nadiad, 1998.
5. Dongarjal, R.P and Zade, S.B. *Insect Ecology and Integrated Pest Management*. Akinik Publications, New Delhi, 2019.

REFERENCES

Books

1. Vayas,S.C, Vayas, S and Modi, H.A. *Bio-fertilizers and organic Farming*. Akta Prakashan, Nadiad, 1998.
2. Sathe, T.V. *Vermiculture and Organic Farming*. Daya publishers, 2004.
3. Subha Rao, N.S. *Soil Microbiology*. Oxford & IBH Publishers, New Delhi, 2000.
4. Reddy, S.R. *Fundamentals of Agronomy*. Kalyani Publications, Uttar Pradesh, 2019.
5. Tolanur, S. Fundamentals of Soil Science IIndEdition , CBS Publishers , New Delhi, 2018.

Web Sources

1. https://www.amazon.com/Beginners-Practical-botanical-horticulture-landscape-ebook/dp/B00MOURUNY
2. https://www.e-booksdirectory.com/listing.php?category=323
3. http://www.freebookcentre.net/Biology/Agriculture-Books.html
4. https://casfs.ucsc.edu/about/publications/Teaching-Organic-Farming/PDF-downloads/TOFG-all.pdf.
5. https://www.amazon.in/s?k=the+organic+farming+manual&hvadid=72636563575133&hvbmt=bb&hvdev=c&hvqmt=b&tag=msndeskstdin21&ref=pd_sl_6sbf0qtxcy_b

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF BOTANY
UG Programme – B.Sc. Botany
SEMESTER - I
SKILL ENHANCEMENT COURSE - II: NON-MAJOR ELECTIVE COURSE:
ENVIRONMENTAL BIOTECHNOLOGY (23UBYN12)
(From 2023 - 2024 Batch onwards)

HOURS/WEEK: 2 **INT. MARKS: 25**
CREDITS : 2 **EXT. MARKS: 75**
DURATION : 30 hrs **MAX.MARKS: 100**

Course Objectives

- To introduce the student to the various developed and applications of environmental biotechnology.
- To provide knowledge about the scope of bioremediation and bioleaching using GMOs.
- To study about pollution of water bodies.
- To know about bioremediation.
- To study about biomineralization.

Course Outcomes (CO)

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

CO1[K1]: recognize the various causes of pollution and control measures.
CO2[K2]: explain the beneficially role of GMOs on environment.
CO3[K3]: reflect upon various sustainable environmental protection strategies.
CO4[K4]: analyze the different methods of air, water, and soil quality monitoring process
CO5[K5]: evaluate the implications of international legislations and policies for environmental protection

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K1]	3	2	1	3	2	1	2
CO2[K2]	3	3	2	1	2	3	2
CO3[K3]	2	2	3	3	1	2	2
CO4[K4]	2	2	1	1	2	3	2
CO5[K5]	2	3	2	3	1	2	3
Weightage of the course	**12**	**12**	**9**	**11**	**8**	**11**	**11**
Weighted percentage of course contribution to POs	**2.17**	**2.39**	**2.26**	**2.51**	**2.71**	**3.83**	**3.55**

Based on the level of contribution ('3'-Strong, '2'-Medium, '1'-Low '-' No Correlation)

UNIT I **(6 hrs)**

Introduction: The environment-soil-water and air, Pollution and its causes (outline only)

UNIT II **(6 hrs)**

Source and treatment of polluted waters and effluents: Pollution of water bodies by heavy metals and pesticides – removal of heavy metals and pesticides by Biosorption, Removal of oil spills by using microbes, Biological treatment of sewage – characteristics of sewage and objectives in sewage treatment – Anaerobic digestion.

UNIT III **(6 hrs)**

Soil and air pollution and their treatment: Soil pollution by Xenobiotics- Degradation of Xenobiotics – pathways of phenol-pentachlorophenol- polychlorinated biphenyl degradation.

UNIT IV – **(6 hrs)**

Bioremediation: Introduction to bioremediation-*ex situ* and *in situ* bioremediation.

UNIT V **(6 hrs)**

Biometallurgy and related topics: Biomineralization – bioleaching - Biofilms - biocorrosion.

TEXTBOOKS

1. Alan Scragg. *Environmental Biotechnology*. Pearson Education Limited, 1999.
2. Dubey R.C. *A text book of Biotechnology aspects of microbiology*. British Sun Publication, 2004.
3. Joseph C. Deniel. *Environmental aspects of microbiology*. British Sun Publication, 1996
4. Keeshav Thehan. *Biotechnology.* New age international (P) Limited, New Delhi, 1997.
5. Chandra, A.M and Ghosh, S.K. Remote sensing and Geographical Information System, Narosa Publishing House Pvt. Ltd. New Delhi, 2010.

REFERENCES

Books

1. Sharma, P.D. *Environmental Microbiology,* Narosa Publishing House Pvt. Ltd., New Delhi, 2005.
2. Raina Maier M. Iran Pepper L., Charles P. *Gerba, Environmental Microbiology*. Academic press, U.K., 2000.
3. Alexander N. Glazer and Hiroshi Nikaido. *Microbial Biotechnology*, 1994.
4. Special issue on Bioremediation and biodegradation. Indian Journal of Experimental Biology. National Institute of Science Communication and

Information Resources, CSIR New Delhi, Vol. 41(9): September 2003.
5. Keddy, P.A. *Plant Ecology*. Origins, processes, consequences. 2nd ed. Cambridge University Press. 2017.

Web Sources

1. https://www.elsevier.com/books/environmental-biotechnology/vallero/978-0-12-407776-8
2. http://www.freebookcentre.net/biology-books-download/Environmental-Biotechnology.html
3. https://www.amazon.in/INTRODUCTION-ENVIRONMENTAL-BIOTECHNOLOGY-K-Chatterji-ebook/dp/B00K7YGIWI
4. https://books.google.co.in/books/about/Textbook_of_Environmental_Biotechnology.html?id=Q2ROFx0WtBQC&redir_esc=yhttp://library.umac.mo/ebooks/b28045907.pdf

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF BOTANY
UG Programme – B.Sc. Botany
SEMESTER - I
SKILL ENHANCEMENT COURSE - II: NON-MAJOR ELECTIVE COURSE:
NURSERY AND LANDSCAPE MANAGEMENT (23UBYN13)
(From 2023 - 2024 Batch onwards)

HOURS/WEEK: 2 **INT.MARKS:25**
CREDITS : 2 **EXT.MARKS:75**
DURATION : 30 hrs **MAX.MARKS:100**

Course Objectives

- To recognize the importance of growing plants and practice the knowledge gained by developing kitchen garden and ornamental garden.
- To be able to design gardens and become entrepreneur in Horticulture.
- To study the methods of propagation.
- To know about nursery structure.
- To learn about gardening.

Course Outcomes (CO)

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

CO1[K1]: recognize the basic principles and components of gardening
CO2[K2]: explain the bio-aesthetic planning and conceptualize flower arrangement
CO3[K3]: apply the techniques for design various types of gardens according to the culture and art of bonsai
CO4[K4]: compare and contrast different garden styles and landscaping patterns
CO5[K5]: prioritize and maintain special types of gardens for outdoor and indoor landscaping

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K1]	3	2	1	3	2	1	2
CO2[K2]	3	3	2	1	2	3	2
CO3[K3]	2	2	3	3	1	2	2
CO4[K4]	2	2	1	1	2	3	2
CO5[K5]	2	3	2	3	1	2	3
Weightage of the course	**12**	**12**	**9**	**11**	**8**	**11**	**11**
Weighted percentage of course contribution to POs	**2.17**	**2.39**	**2.26**	**2.51**	**2.71**	**3.83**	**3.55**

Based on the level of contribution ('3'-Strong, '2'-Medium, '1'-Low '-' No Correlation)

UNIT I **(6 hrs)**

Nursery: Introduction – Prospects and Scope of Nursery and landscaping. Climate factors – Edaphic factors – Nutritional need for Nursery cultivation – Pruning methods.

UNIT II **(6 hrs)**

Gardening: Types of Gardening – Formal garden – Informal garden – Vegetable garden – Landscaped layout designing – formation and maintenance of lawn.

UNIT III **(6 hrs)**

Structures of garden: Introduction – Green house – Shade house – Mist chamber – Topiary – Bonsai culture

UNIT IV **(6 hrs)**

Plant Propagation: Methods of Propagation – Cutting – Layering – Grafting - Budding. Floriculture: cultivation of Rose – Chrysanthemum – Jasmine.

UNIT V **(6 hrs)**

Nursery Management: Manures – composting – vermicomposting – use of Hormones – pest and disease management – storage and marketing.

TEXTBOOKS

1. Amarnath V. *Nursery and Landscaping*. M/s IBD Publishers, New Delhi, 2006.
2. Butts, E and Stensson, K. Sheridan Nurseries: *One hundred years of People, Plans, and Plants.* Dundurn Group Ltd, 2012.
3. Russell, T. Nature Guide: Trees: The world in your hands (Nature Guides). Mukherjee D. Gardening in India, Oxford IBH publishing co, New Delhi, 2012.
4. Kumar, N. Introduction to Horticulture, Rajalakshmi Publications, Nagercoil, 1997.
5. Butts, E. and Stensson, K. *Sheridan Nurseries: One hundred years of People, Plans, and Plants.* Dundurn Group Ltd. 2012.

REFERENCES

Books

1. Edmond Musser and Andres, Fundamentals of Horticulture, McGraw Hill Book Co. New Delhi.
2. Agrawal, P.K. Hand Book of Seed Technology, Dept. of Agriculture and Cooperation, National Seed Corporation Ltd., New Delhi, 1993.
3. Janick Jules. Horticultural Science. (3rd Ed.), W.H. Freeman and Co.,San Francisco, USA, 1979.

4. Singh, J. Fundamentals of Horticulture. Kalyani Publishers, 2018.
5. Sharma V. K. Encyclopaedia of Practical Horticulture, Vol I –IV, Deep and Deep Publ. Pvt. Ltd. 1999.

Web Sources

1. https://www.kopykitab.com/higher-education-ebooks/higher-educationebooks/Agricultural-Industry-agriculture-eBooks/Nursery-And-Landscaping-by-V-Amarnath
2. https://www.amazon.in/Nursery-Landscaping-Veena-Amarnath/dp/8177542788
3. https://www.amazon.in/Gardening/b?ie=UTF8&node=1637077031
4. https://in.pinterest.com/pin/496733033900458021/?lp=truehttps://www.gardenvisit.com/ebooks

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF TAMIL
UG PROGRAMME - B.A./ B.COM/B.B.A./ B.SC./BCA
SEMESTER - II
பொதுத்தமிழ் - II (23UTAG21)
(From 2023-2024 Batch onwards)

HOURS / WEEK	**: 6**	**INT. MARKS: 25**
CREDITS	**: 3**	**EXT. MARKS: 75**
DURATION	**: 90 hrs**	**MAX.MARKS:100**

நோக்கங்கள்

- சமய இலக்கியங்களையும் சிற்றிலக்கியங்களையும் மாணவர்களுக்கு அறிமுகப்படுத்துதல்
- மொழித்திறனையும் சிறுகதை இலக்கிய வடிவத்தையும் மாணவர்களுக்கு உணர்த்துதல்.

கற்றலின் விளைவுகள்

CO1[K1]: பக்தி இலக்கியங்களைக் கற்பதன் மூலம் பக்தி நெறியினையும், சமய நல்லிணக்கத்தையும் அறிவர்.

CO2[K2]: சமயப்பாடல்கள் மற்றும் சிற்றிலக்கியங்களின் அமைப்பினையும், நோக்கத்தினையும் தெளிவாகக் கூறுவர்.

CO3[K3]: தமிழில் உள்ள பக்தி இலக்கியம் மற்றும் சிற்றிலக்கியங்களின் பொருண்மைகளுடன் இலக்கணத் தெளிவையும் அடைவர்.

CO4[K4]: தமிழ்ச் சமூகப் பண்பாட்டு வரலாற்றினை இலக்கியங்கள் வாயிலாக அறிந்து கொண்டு பாகுபடுத்துவர்.

CO5[K5]: போட்டித் தேர்வுகளில் வெற்றி பெறுவதற்குத் தமிழ்ப் பாடத்தினைப் பயன்கொள்ளும் வகையில் ஏற்ற பயிற்சி பெற்று மதிப்பீடு செய்வர்.

CO/PO Mapping Table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K1]	2	1	-	1	-	-	-
CO2[K2]	2	2	-	1	1	-	1
CO3[K3]	2	2	-	2	-	1	-
CO4[K4]	2	2	1	2	1	-	1
CO5[K5]	2	1	1	2	-	1	1
Weightage of the Course	10	08	02	08	02	02	03
Weighted percentage of Course Contribution to POs	**1.81**	**1.59**	**0.5**	**1.83**	**0.68**	**0.7**	**0.97**

Based on the Level of Contribution ('3' -High, '2' -Medium, '1' -Low, '-' No Correlation)

கூறு I **(18 hrs)**

பக்தி இலக்கியம்: திருநாவுக்கரசர் தேவாரம் - நாமார்க்கும் குடியெல்லாம் எனத் தொடங்கும் பதிகம் (10 பாடல்கள்), ஆண்டாள் - திருப்பாவை (முதல் 10 பாசுரம்)

கூறு II **(18 hrs)**

வள்ளலார் - அருள் விளக்கமாலை (முதல் 10 பாடல்),எச்.ஏ.கிருட்டிணப் பிள்ளை - இரட்சணியமனோகரம் - பால்யபிரார்த்தனை, குணங்குடி மஸ்தான் சாகிபு - பராபரக்கண்ணி (முதல் 10 கண்ணி)

கூறு III **(18 hrs)**

சிற்றிலக்கியங்கள்: தமிழ்விடு தூது (முதல் 20 கண்ணி), திருக்குற்றாலக் குறவஞ்சி - குறத்தி மலைவளம் கூறுதல், முக்கூடல் பள்ளு - நாட்டு வளம்

கூறு IV **(18 hrs)**

பாடம் தழுவிய இலக்கிய வரலாறு (பல்லவர் காலம், நாயக்கர் காலம்)

கூறு V **(18 hrs)**

மொழித்திறன் போட்டித்தேர்வுதிறன்: தொடர் வகைகள், மரபுத்தொடர், பழமொழிகள், பிறமொழிச் சொற்களைக் களைதல், வழுச்சொற்கள் நீக்குதல், இலக்கணக் குறிப்பு அறிதல்.

(குறிப்பு: அலகு 4, 5 ஆகியன போட்டித் தேர்வு நோக்கில் நடத்தப் பட வேண்டும்).

பாடநூல்கள்

1. தமிழியல் துறையினர், *தொகுப்பு நூல்,* ஸ்ரீ காளீஸ்வரி கல்லூரி (தன்னாட்சி), சிவகாசி.
2. வாசுதேவன், கா. *பன்முக நோக்கில் தமிழ் இலக்கிய வரலாறு,* தேவன் பதிப்பகம், திருச்சிராப்பள்ளி, 2017.

பார்வை நூல்கள்

1. சிற்பி. பாலசுப்பிரமணியன், *தமிழ் இலக்கிய வரலாறு,* கவிதா வெளியீடு, சென்னை.
2. தமிழண்ணல், *புதிய நோக்கில் தமிழ் இலக்கிய வரலாறு,* சோலை பதிப்பகம், மதுரை
3. பாக்கியமேரி, *வகைமை நோக்கில் தமிழ் இலக்கிய வரலாறு,* பாரி நிலையம், சென்னை.

வலைப்பதிவுகள் (Web Sources)

1. Tamil Heritage Foundation- www.tamilheritage.org <http://www.tamilheritage.org>
2. Tamil virtual University Library- www.tamilvu.org/ library http://www.virtualvu.org/library
3. Project Madurai - www.projectmadurai.org.
4. Chennai Library- www.chennailibrary.com <http://www.chennailibrary.com>.
5. Tamil Universal Digital Library- www.ulib.prg <http://www.ulib.prg>.
6. Tamil E-Books Downloads- tamilebooksdownloads. blogspot.com
7. Tamil Books on line- books.tamil cube.com
8. Catalogue of the Tamil books in the Library of British Congress archive.org
9. Tamil novels on line - books.tamilcube.com

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF ENGLISH
UG PROGRAMME - B.A./ B.COM/B.B.A./ B.SC./BCA
SEMESTER- II
GENERAL ENGLISH-II (23UENL21)
(From 2023-2024 Batch onwards)

HOURS/WEEK: 6(L-5, T-1) **INT. MARKS : 25**
CREDITS : 3 **EXT. MARKS: 75**
DURATION : 90 hrs **MAX. MARKS: 100**

Course Objectives

- To introduce learners to the essential skills of communication in English.
- To enable them use these skills effectively in academic and non-academic contexts.
- To help them identify and eliminate common mistakes in writing and speaking.
- To enable them use various business communication strategies and to use advanced vocabulary.
- To familiarize them in writing descriptive essays and respond to arguments orally and in writing.

Course Outcomes (CO)

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

CO1 [K1]: identify appropriate literary terms such as diction, tone, imagery, figures of speech, motif etc.,

CO2 [K2]: define verbs, tenses and concord and its role in speaking and writing effectively.

CO3 [K3]: apply the knowledge of language competency at workplace and day-to-day life

CO4 [K4]: analyze prose, poetry and short stories to develop language skills through literature.

CO5 [K6]: construct grammatically correct and meaningful sentences by choosing apt words.

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K1]	2	1	-	1	-	-	-
CO2[K2]	2	2	-	1	1	-	1
CO3[K3]	2	2	-	2	-	1	-
CO4[K4]	2	2	1	2	1	-	1
CO5[K6]	2	1	1	2	-	1	1
Weightage of the course	10	08	02	08	02	02	03
Weighted percentage of Course contribution to POs	**1.81**	**1.59**	**0.5**	**1.83**	**0.68**	**0.7**	**0.97**

Based on the level of contribution ('3'-High, '2'-Medium, '1'-Low '-' No Correlation)

UNIT I- PROSE **(18 hrs)**

W.R. Inge	-	The Spoon-Fed Age
Dale Carnegie	-	If You Are Wrong. Admit it
Shashi Tharoor	-	Kindly Adjust to our English

UNIT II- POETRY **(18 hrs)**

Alfred Lord Tennyson	-	The Flower
Nissim Ezekiel	-	Very Indian Poem in Indian English
Maya Angelou	-	Still I Rise
Dr. Gieve Patel	-	On Killing a Tree

UNIT III- FICTION **(18 hrs)**

Paulo Coelho	-	The Alchemist

UNIT IV- LANGUAGE COMPETENCY **(18 hrs)**

Homonyms, Homophones, Homographs, Portmanteau words
Verbs and Tenses, Subject Verb Agreement, Error correction

UNIT V- ENGLISH IN THE WORKPLACE **(18 hrs)**

Reading for General and Specific information [charts, tables, schedules, graphs etc]
Reading news and weather reports
Writing paragraphs
Taking and making notes

TEXTBOOKS

1. Coelho, Paulo. *The Alchemist*. New York: Harper, 2005.
2. Pillai, Radhakrishna. *Emerald English Grammar and Composition.* Chennai: Emerald Publishers, 2016.

REFERENCES

Books

1. Hewings, Martin. *Advanced English Grammar*. Cambridge University Press, 2000.
2. SP Bakshi, Richa Sharma. *Descriptive English*. India: Arihant Publications Ltd, 2019.
3. Sheena Cameron, Louise Dempsey. *The Reading Book: A Complete Guide to Teaching Reading*. London: S & L. Publishing, 2019.
4. Sherman, Barbara. *Skimming and Scanning Techniques.* Virginia: Liberty University Press, 2014.
5. Chambers, Phil. *Brilliant Speed Reading: Whatever you need to read, However You want to Read it-Twice as Quickly*, India: Pearson, 2013.
6. Coelho, Paulo. *The Archer*. New York: Penguin Viking, 2020.

Web Sources

1. http://econtent.in/pacc.in/admin/contents/40_%20_2020103001102714.pdf
2. https://www.poetryfoundation.org/poems/46446/still-i-rise
3. https://www.poemhunter.com/poem/the-flower-2/
4. https://www.poemhunter.com/poem/on-killing-a-tree/
5. https://www.tbr.fun/if-youre-wrong-admit-it/
6. https://www.theweek.in/columns/shashi-tharoor/2018/05/25/kindly-adjust-to-our-english.html?fbclid=IwAR3IhtdXqvuV4ySECn9S7SA6HmCEYISyd1QHd3BlwKgiNKKwdkeSg3qWp-U/
7. https://docplayer.net/217945876-The-spoon-fed-age-1-by-the-very-reverend-w-r-inge.html
8. https://www.youtube.com/watch?v=lxBYpmxjeDU

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF BOTANY
UG Programme – B.Sc. Botany
SEMESTER – II
CORE COURSE – III: PLANT DIVERSITY II: FUNGI, BACTERIA, VIRUSES, PLANT PATHOLOGY AND LICHENS (23UBYC21)
(From 2023-2024 Batch onwards)

HOURS/WEEK: 4 (L-3, T-1) **INT. MARKS: 25**
CREDITS : 4 **EXT. MARKS: 75**
DURATION : 60 hrs **MAX.MARKS:100**

Course Objectives

- To describe the common characteristics of fungi as being heterotrophic, unicellular/multicellular.
- To understand the biology of fungi and to discuss the importance of fungi in various ecological roles.
- To understand lichen structure, function, identification, and ecology; comprehend the events of symbiosis and lichenization and to demonstrate the use of lichens as bio-indicator species.
- To identify the main groups of plant pathogens, their symptoms.
- To understand the various types of plant diseases.

Course Outcomes (CO)

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

CO1[K1]: recognize the general characteristics of microbes, fungi and lichens and disease symptoms

CO2[K2]: review the understanding of microbes, fungi and lichens and appreciate their adaptive strategies based on structural organization

CO3[K3]: identify the common plant diseases, according to geographical locations and device control measures

CO4[K4]: analyze the emerging trends in fungal biotechnology with special reference to agricultural and pharmaceutical applications

CO5[K5]: determine the economic importance of microbes, fungi and lichens

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K1]	3	3	3	3	2	1	2
CO2[K2]	3	3	3	2	3	3	2
CO3[K3]	3	2	3	1	2	2	1
CO4[K4]	3	3	3	3	3	2	3
CO5[K5]	3	3	2	3	2	3	3
Weightage of the course	15	14	14	12	12	11	11

Weighted percentage of course contribution to POs	**2.71**	**2.78**	**3.51**	**2.74**	**4.07**	**3.83**	**3.55**

Based on the level of contribution ('3'- Strong, '2'-Medium, '1'-Low '-' No Correlation)

UNIT I **(12 hrs)**

FUNGI: Classification of fungi - (Alexopoulos and Mims, 1979)- Characteristic features- thallus organization- mode of nutrition- structure- reproduction and life-history of classes each with suitable example(s): Zygomycotina- *Mucor and Rhizopus*, Ascomycotina-*Aspergillus*, Basidiomycotina-*Agaricus,* Deuteromycotina-*Cercospora*. Importance of mycorrhizal association.

UNIT II **(12 hrs)**

ECONOMIC IMPORTANCE OF FUNGI: *Pleurotus* (food)-Fungi in agriculture application (biofertilizers): Mycotoxins-biopesticides, Production of industrially important products from fungi- alcohol (ethanol), organic acids (citric acid), enzymes (protease), Vitamins- applications of fungi in pharmaceutical products (Penicillin)- Importance of VAM fungi - Harmful effects of Fungi.

UNIT III **(12 hrs)**

BACTERIA, VIRUS: General characters of Bacteria and Viruses. Classification (Bergey's, 1994) - , structure and reproduction of bacteria-Mycoplasma, Virology -Viruses general characters- structure and reproduction.

UNIT IV **(12 hrs)**

PLANT PATHOLOGY: General symptoms of plant diseases - Geographical distribution of diseases, Etiology-Host-Pathogen relationships- prevention and control of the following plant diseases- Bacterial diseases – Citrus canker and Bacterial wilt of Banana, Viral diseases – Tobacco Mosaic and Vein clearing of Papaya - Fungal diseases – Blast disease in rice and Tikka disease.

UNIT V **(12 hrs)**

LICHEN: Classification (Hale, 1969)- Habitat- nature of association-Structure- Nature of Mycobionts and Phycobionts, Study of growth forms of lichens –crustose- foliose - fruticose, types- distribution- thallus organization-reproduction and ecological significance of lichens with special reference to *Usnea*. Economic importance of Lichens:

TEXTBOOKS

1. Pandey, B.P. College Botany. Vol. I Fungi & Pathology, 1997.
2. Mehrotra, R.S and Aneja, K.R. An introduction to mycology. New age International (P) Ltd, Publishers, New Delhi, 2003.

3. Poonam Singh and Ashok Pandey. Biotechnology for agro-Industrial residues utilization. Springer, 2009.
4. Satyanarayana T and Johri B.N. Microbial diversity, Current Perspectives and Potential Applications, IK International, 2005.
5. Nair, L.N. Topics in Mycology and Pathology, New Central Book agency, Kolkata, 2007.
6. Sharma, P.D. Plant Pathology, Rastogi Publication, Meerut, India, 2011.
7. Mahendra Rai. Advances in Fungal Biotechnology. I.K. International Publishing House, New Delhi, 2009.

REFERENCES

Books

1. Alexopoulos, C.J., Mims, C.W., Blackwell, M. *Introductory Mycology*. 4th edition. John Wiley & Sons (Asia) Singapore, 1996.
2. Webster, J and Weber, R. *Introduction to Fungi.* 3rd edition. Cambridge University Press, Cambridge, 2007.
3. Sharma, O.P. *Fungi and allied microbes* The McGraw –Hill companies, New Delhi, 2011.
4. Burnett, J.H. *The fundamentals of Mycology.* ELBS Publication, London, 1971.
5. Bessey, E.A. *Morphology and Taxonomy of fungi*, Vikas publishing House Pvt. Ltd, New Delhi, 1979.
6. Dharani Dhar Awasthi. *A Handbook of Lichens* Vedams eBooks (P) Ltd. New Delhi, 2000.
7. Pelzer, M.J., Chan, E.C.S and Krieg, N.R. *Microbiology*, Tata MaGraw Hill Publishing House, New Delhi, 1983.
8. Pandey, P.B. *College Botany- 1:Including Algae, Fungi, Lichens, Bacteria, Viruses, Plant Pathology, Industrial Microbiology and Bryophyta.* Chand Publishing, New Delhi, 2014.
9. Mishra, A. and Agarwal, R.P. *Lichens –A Preliminary Text*. Oxford and IBH, 1978.
10. Pandey, B.P. *College Botany I: Including Algae, Fungi, Lichens, Bacteria, Viruses, Plant Pathology, Industrial Microbiology and Bryophyta.* S Chand & Company, 2005.

Web Sources

1. https://www.amazon.in/Fungi-Sarah-C-Watkinson-ebook/dp/B0199YFDFE
2. http://www.freebookcentre.net/biology-books-download/A-text-book-of-mycology-and-plant-pathology.html
3. http://www.freebookcentre.net/Biology/Mycology-Books.html
4. https://www.kobo.com/us/en/ebook/introduction-to-fungi
5. http://www.freebookcentre.net/biology-books-download/Introductory-Mycology.html
6. http://www.freebookcentre.net/biology-books-download/Fungi-(PDF-15P).html

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI

DEPARTMENT OF BOTANY

UG Programme – B.Sc. Botany

SEMESTER – II

CORE COURSE – IV: PRACTICAL: PLANT DIVERSITY II - FUNGI, BACTERIA, VIRUSES, PLANT PATHOLOGY AND LICHENS (23UBYC2P)

(From 2023-2024 Batch onwards)

HOURS/WEEK: 4 **INT. MARKS: 25**
CREDITS : 4 **EXT. MARKS: 75**
DURATION : 60 hrs **MAX. MARKS: 100**

Course Objectives

- To enable students to identify microscopic and macroscopic fungi.
- To prepare microslides of fungi and lichens.
- To know the presence of pathogen inside the plant tissues through microscopic sections.
- To identify the bryophytes based on the morphology and microslides.
- To know the economic importance of the microbes studied.

Course Outcomes (CO)

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

CO1[K2]: identify the microbes, fungi and lichens using key identifying characters

CO2[K3]: discover the practical skills for culturing and cultivation of fungi

CO3[K4]: identify and select suitable control measures for the common plant diseases

CO4[K5]: analyze the characteristics of microbes, fungi and plant pathogens

CO5[K6]: access the useful role of fungi in agriculture and pharmaceutical industry

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K2]	3	3	3	2	1	2	2
CO2[K3]	3	2	2	3	3	2	3
CO3[K4]	2	3	3	1	2	1	3
CO4[K5]	3	3	3	3	2	3	3
CO5[K6]	3	3	3	2	3	3	3
Weightage of the course	14	15	14	11	11	11	14
Weighted percentage of course contribution to POs	**2.53**	**2.98**	**3.51**	**2.51**	**3.73**	**3.83**	**4.52**

Based on the level of contribution ('3'-Strong, '2'-Medium, '1'-Low '-' No Correlation)

Micro Preparations, Observations, Identification and mounting the slides for Vegetative part of the following Specimens:

EXPERIMENTS

1. Microscopic observation of vegetative and reproductive structures of types prescribed in the syllabus through temporary preparations and permanent slides.
2. Identifying the micro slides relevant to the syllabus.
3. Herbarium specimens of bacterial diseases/photograph.
4. Protocol for mushroom cultivation.
5. Inoculation techniques for fungal culture (Demonstration only). Study of economically important products obtained from fungi: Fungal biofertilizers, biopesticides, biofungicide (*Trichoderma*), edible mushroom/Yeast, organic acids (citric acid) enzymes (protease), antibiotics and vitamins.
6. Mycorrhiza: ecto-mycorrhiza and endo-mycorrhiza (Photographs)
7. Visit to fungal biotechnology laboratories.
8. Ultra sturcture of bacteria.
9. Structure of bacteriophage.
10. Micro-preparation of *Usnea* to study vegetative and reproductive structures.
11. Identifying the micro slides relevant to the syllabus.
12. Study thallus and reproductive structures of lichens (apothecium) through permanent slides.
13. Economic importance of Lichens - Dye and perfume.

TEXTBOOKS

1. Chmielewski, J.G andKrayesky,D. *GeneralBotany laboratory Manual.*AuthorHouse, Bloomington, USA, 2013.
2. Das,SandSaha,R.*MicrobiologyPracticalManual.*CBSPublishersandDistributors (P) Ltd., New Delhi,India, 2020.
3. Webster,J and Weber,R. *Introduction to Fungi*, *3rd Ed.*Cambridge University Press, Cambridge,2007.
4. Nair, L.N. *Topics in Mycology and Pathology*. New Central Book agency, Kolkata, 2007.
5. Nair, L.N. *Topics in Mycology and Pathology*. New Central Book agency, Kolkata2007.

REFERENCES

Books

1. Alexopoulos, Jand Mims,W. 1985.Introductory Mycology,Wiley Eastern Limited NewDelhi.
2. Bendre,M.Ashok and Ashok Kumar,A. 2020. Text Book of Practical Botany 1 (10thed). Rastogi Publications, Meerut.
3. Singh, R and U.C. Singh 2020. Modern mushroom cultivation, 3d Edition Agrobios (India), Jodhpur.

4. Poonam Singh and Ashok Pandey. 2009. Biotechnology for agro-Industrial residues utilization. Springer.
5. Satyanarayana T and Johri B.N. 2005. Microbial diversity, Current Perspectives and Potential Applications, IK International.

Web sources

1. https://www.amazon.in/Practical-Manual-Fungi-Fungicides/dp/B0025AEFP4
2. https://books.google.co.in/books/about/Practical_Mycology.html?id=5ycJAQAAMAAJ&redir_esc=y
3. https://www.flipkart.com/colour-handbook-practical-plant-pathology/p/itmefsn6dyhfhs9b
4. https://books.google.co.in/books/about/Practical_Botany.html?id=T5narQEACAAJ&redir_esc=y
5. https://www.kobo.com/us/en/ebook/introduction-to-fungi

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF BOTANY
UG Programme – B.Sc. Botany
SEMESTER – II
ELECTIVE COURSE GENERIC / DISCIPLINE SPECIFIC – II
CONCEPTUAL ZOOLOGY (23UBYA21)
(From 2023-2024 Batch onwards)

HOURS/WEEK: 4 (L-3, T-1) **INT. MARKS: 25**
CREDITS : 3 **EXT. MARKS: 75**
DURATION : 60 hrs **MAX. MARKS:100**

Course Objective

- To give a brief introduction to the Cellular and Physiological aspects of animals.
- To have an enhanced knowledge on Microscopes, Cytological techniques.
- To give an insight to Developmental biology and Immunology of animals.
- To give students idea about Teratogenesis, *In vitro* fertilization, Stem cells and Amniocentesis.

Course Outcomes (CO)

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

CO1[K1]: distinquise mitosis and meiosis
CO2[K2]: understand placenta, Test tube babis and cancer
CO3[K3]: study of Mendalian traits, Eugenics and Eutherric
CO4[K4]: explain blood groups and ECG
CO5[K5]: describe gene clone and Transgenic animals

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K1]	3	3	1	3	2	1	2
CO2[K2]	3	2	2	2	2	2	2
CO3[K3]	2	2	3	1	1	2	1
CO4[K4]	2	2	3	1	2	2	3
CO5[K5]	2	1	2	1	1	1	3
Weightage of the course	**12**	**10**	**11**	**08**	**08**	**08**	**11**
Weighted percentage of course contribution to POs	**2.17**	**1.99**	**2.76**	**1.83**	**2.71**	**2.79**	**3.55**

Based on the level of contribution ('3'- Strong, '2'-Medium, '1'-Low '-' No Correlation)

UNIT I- CELL BIOLOGY **(12 hrs)**

1. Prokaryotes & Eukaryotes.
2. Cell division – mitosis & meiosis.
3. Nucleic acid – DNA structure.

UNIT II- DEVELOPMENTAL BIOLOGY **(12 hrs)**

1. Placenta in mammals.
2. Test tube babies
3. Cancer

UNIT III- GENETICS **(12 hrs)**

1. Mendelian traits in man & Pedigree analysis.
2. Sex determination in man.
3. Syndromes [Klinefelter, Turner, Down & Cri-du-Chart] in man.
4. Eugenics & euthenics.

UNIT IV - ECO-PHYSIOLOGY **(12 hrs)**

1. Blood groups – antigen & antibody reactions, Rh incompatibility, blood sugar & cholesterol.
2. Structure and functions of Human heart – functional disorders and reasons – ECG
3. Menstrual cycle & birth control in man.
4. Global warming.

UNIT V- BIOTECHNOLOGY **(12 hrs)**

1. Gene cloning – introduction of rDNA into cells – Identification of rDNA.
2. Transgenic animals – Transgenic Fish, Sheep and Pig.
3. Fermentation technology.

TEXTBOOKS

1. Arumugam.N. *Cell Biology*. Saras publications. 2013.
2. Arumugam.N. *Developmental Zoology*. Saras publications. 2011.
3. Meyyan R.P. *Genetics*. Saras publications. 2014.
4. Arumugam.N. *Animal Physiology.* Saras publication. 2013.
5. V.Kumaresan – *Biotechnology*. Saras Publication., Nagercoil. 2015

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF BOTANY
UG Programme – B.Sc. Botany
SEMESTER – II
ELECTIVE COURSE GENERIC/DISCIPLINE SPECIFIC - II: PRACTICAL: CONCEPTUAL ZOOLOGY (23UBYA2P)
(From 2023-2024 Batch onwards)

HOURS/WEEK: 2 **INT. MARKS: 25**
CREDITS : 2 **EXT. MARKS: 75**
DURATION : 30 hrs **MAX. MARK: 100**

Course Objectives

- To Learn and be familiar with the Laboratory techniques.
- To understand the taxonomic position, body organization and evolutionary relationship of animals. To inculcate the significance of various non chordates and chordates.

Course Outcomes (CO)

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

CO1[K2]: examine the familiar with practical skills in the use of tools, technologies and methods common to Structure of DNA
CO2[K3]: apply knowledge and come to know how to handle different organisms
CO3[K4]: analyze and to observe mitosis by using Microscope.
CO4[K5]: survey the animal diversity in Placenta of rabbit & pig.
CO5[K6]: evaluate the various techniques used for Blood group testing purposes

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K2]	3	3	1	3	2	1	2
CO2[K3]	3	2	2	2	2	2	2
CO3[K4]	2	2	3	1	1	2	1
CO4[K5]	2	2	3	1	2	2	3
CO5[K6]	2	1	2	1	1	1	3
Weightage of the course	12	10	11	08	08	08	11
Weighted percentage of course contribution to POs	**2.17**	**1.99**	**2.76**	**1.83**	**2.71**	**2.79**	**3.55**

Based on the level of contribution ('3'- Strong, '2'-Medium, '1'-Low '-' No Correlation)

CONCEPTUAL ZOOLOGY:

1. Mitosis – Onion root tip mounting.
2. Structure of DNA.
3. Placenta of rabbit and pig.
4. Mendelian traits in man.
5. Blood grouping.
6. Blood sugar.

TEXTBOOKS

1. Arumugam.N. *Cell Biology*. Saras publications. 2013.
2. Arumugam.N. *Developmental Zoology*. Saras publications. 2011.
3. Meyyan R.P. *Genetics*. Saras publications. 2014.
4. Arumugam.N. *Animal Physiology.* Saras publication. 2013.
5. V.Kumaresan – *Biotechnology*. Saras Publication., Nagercoil. 2015

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI

DEPARTMENT OF BOTANY

UG Programme – B.Sc. Botany

SEMESTER – II

SKILL ENHANCEMENT COURSE – III: BOTANICAL GARDEN AND LANDSCAPING (23UBYS21)

(From 2023 - 2024 Batch onwards)

HOURS/WEEK: 2 **INT. MARKS: 25**
CREDITS : 2 **EXT. MARKS: 75**
DURATION : 30 hrs **MAX.MARKS: 100**

Course Objectives

- To know about the fundamental concepts of gardening and landscaping.
- To provide an overview of various gardening styles and its scope in recreation and bio-aesthetic planning.
- To illustrate the significance of garden adornments and propagation structures.
- To inculcate entrepreneurial skills in students for creative landscaping design using CAD software.
- To create the design outdoor and indoor gardens and inculcate entrepreneurial skills for landscaping.

Course Outcomes (CO)

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

CO1[K1]: recognize the fundamental concepts of gardening and landscaping

CO2[K2]: explain the significance of garden adornments and propagation structures

CO3[K3]: apply the techniques of landscaping for aesthetic purposes and gardening for recreation

CO4[K4]: distinguish between formal, informal and free style gardens and their applications

CO5[K5]: develop and design outdoor and indoor gardens and inculcate entrepreneurial skills for landscaping

CO-PO Mapping table (Course Articulative Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K1]	3	3	1	3	2	1	1
CO2[K2]	3	3	2	2	1	3	2
CO3[K3]	2	2	3	2	1	2	1
CO4[K4]	3	2	2	3	1	2	3
CO5[K5]	2	3	2	3	2	3	1
Weightage of the course	**13**	**13**	**10**	**13**	**07**	**11**	**08**
Weighted	**2.35**	**2.58**	**2.51**	**2.97**	**2.37**	**3.83**	**2.58**

percentage of course contribution to POs							

Based on the level of contribution ('3'-Strong, '2'-Medium, '1'-Low '-' No Correlation)

UNIT I **(6 hrs)**

Principles of gardening, garden components- adornments-lawn making-methods of designing rockery- water garden. Greenhouse- Garden types- values in landscaping- propagation- planting shrubs and herbaceous perennials.

UNIT II **(6 hrs)**

Flower arrangement: importance- production experiments and cultural operations- constraints- post harvest practices. Bioaesthetic planning-definition- urban planning and planting avenues- schools- villages- beautifying railway stations- dam sites, hydroelectric stations- river banks- planting material for play grounds.

UNIT III **(6hrs)**

Vertical gardens- roof gardens. Culture of bonsai- art of making bonsai. Landscape designs- Styles of garden- formal-informal and free style gardens. institutions, industries, residents, hospitals, roadsides, traffic islands, damsites, IT parks, corporate.

UNIT IV **(6 hrs)**

Establishment and maintenance, special types of gardens, Bio-aesthetic planning, eco-tourism, theme parks, indoor gardening, therapeutic gardening, non-plant components, water scaping, xeriscaping, hardscaping.

UNIT V **(6 hrs)**

Computer Aided Designing (CAD) for outdoor and indoor scaping Exposure to CAD (Computer Aided Designing).

TEXTBOOKS

1. Acquaah, J. *Horticulture – principles and practices*, 4th edition, PHI learning Pvt. Ltd. 2009.
2. Rao Manibhushan K. *Textbook of horticulture*. MaC Millan India Ltd. 1991.
3. Gangulee H. C. and Kar A. K. *College Botany Vol II*, New Central Book Agency 2004.
4. Sharma V. K. *Encyclopaedia of Practical Horticulture*, Vol I –IV, Deep And Deep Publ. Pvt. Ltd. 1999.
5. Singh, J. *Fundamentals of Horticulture*. Kalyani Publishers. 2018.

REFERENCES

Books

1. Berry, F. and Kress, J. Heliconia: *An Identification Guide*. Smithsonian Books. 1991.
2. Butts, E. and Stensson, K. *Sheridan Nurseries: One hundred years of People, Plans, and Plants*. Dundurn Group Ltd. 2012.
3. Russell, T. *Nature Guide: Trees: The world in your hands (Nature Guides).* 2012.
4. Acquaah, J. *Horticulture – principles and practices*, 4th edition, PHI learning Pvt. Ltd. 2009.
5. Edment Senn Andrews. *Fundamentals of Horticulture*. Tata. McGraw Hill Publishing Co., Ltd., Delhi. 1994.

Web Sources

1. https://www.amazon.in/Gardening-Landscape-Design-and-Botanical-Garden/s?rh=n%3A1318122031%2Cp_27%3Aand+Botanical+Garden
2. https://www.overdrive.com/subjects/gardening
3. https://www.scribd.com/book/530538456/Opportunities-in-Landscape-Architecture-Botanical-Gardens-and-Arboreta-Careers
4. https://www.scribd.com/book/305542619/Botanic-Gardens
5. https://www.overdrive.com/subjects/gardening

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF BOTANY
UG Programme – B.Sc. Botany
SEMESTER - II
SKILL ENHANCEMENT COURSE IV: NON MAJOR ELECTIVE COURSE:
MUSHROOM CULTIVATION (23UBYN21)
(From 2023 - 2024 Batch onwards)

HOURS/WEEK: 2 **INT. MARKS: 25**
CREDITS : 2 **EXT. MARKS: 75**
DURATION : 30hrs **MAX.MARKS: 100**

Course Objectives

- To learn and develop skills in mushroom cultivation.
- To understand and appreciate the role of mushrooms in Nutrition, Medicine and health.
- To cultivate mushroom cultivation in small scale industry.
- To learn about diseases and post-harvest technology.
- To study new methods and strategies to contribute to mushroom production.

Course Outcomes (CO)

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

CO1[K1]: recognize the basic principles and components of gardening

CO2[K2]: explain the various types of food technologies associated with mushroom industry

CO3[K3]: apply the techniques studied for cultivation of various types of mushroom

CO4[K4]: analyze and decipher the environmental factors and economic value associated with mushroom cultivation

CO5[K5]: develop a new method and strategies to contribute to the mushroom production

CO-PO Mapping table (Course Articulative Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K1]	3	-	-	3	2	1	2
CO2[K2]	3	-	-	2	-	3	2
CO3[K3]	2	-	-	3	-	2	-
CO4[K4]	3	3	3	3	-	2	-
CO5[K5]	2	3	2	-	-	-	3
Weightage of the course	13	06	05	11	02	08	07
Weighted percentage of course contribution to POs	**2.35**	**1.19**	**1.25**	**2.51**	**0.68**	**2.79**	**2.26**

Based on the level of contribution ('3'-Strong, '2'-Medium, '1'-Low '-' No Correlation)

UNIT I **(6 hrs)**

Introduction: Morphology, Types of Mushroom, identification of edible and poisonous mushroom, Nutritive values, life cycle of common edible mushrooms.

UNIT II **(6 hrs)**

Mushroom Shed Construction and Cost of Cultivation – Oyster and Milky Mushroom. Factors affecting mushroom Cultivation. Mushroom Cultivation Training Units and Research Centres in India.

UNIT III **(6 hrs)**

Spawn production, growth media, spawn running and harvesting of mushrooms and marketing. Life cycle of Pleurotus spp and Agaricus spp.

UNIT IV **(6 hrs)**

Mushroom cultivation, prospects and scope of Mushroom cultivation in small scale Industry. Processing – Blanching – Steeping – Sun Drying – Canning – Pickling – Freeze Drying. Storage: Short Term and Long Term Storage.

UNIT V **(6 hrs)**

Diseases and post-harvest technology, Insect pests, nematodes, mites, viruses, fungal competitors and other important diseases. Disease prevention and Control Measures.

TEXTBOOKS

1. A. Manickam. *Handbook of Mushroom Cultivation.* TNAU publication. 1999.
2. Marimuthu, T., Krishnamoorthy, A.S., Sivaprakasam, K. and Jayarajan. R. *Oyster Mushrooms,* Department of Plant Pathology, Tamil Nadu Agricultural University, Coimbatore. 1991.
3. Swaminathan, M. *Food and Nutrition*. Bappco, The Bangalore Printing and Publishing Co. Ltd., 1990.
4. Sing. *Modern Mushroom Cultivation*, International Book Distributors, Dehradun. 2005.
5. Verma, *Mushroom: edible and medicinal: cultivation conservation, strain improvement with their marketing*. Daya Publishing House. 2013.

REFERENCES

Books

1. Marimuthu, T., Krishnamoorthy, A.S., Sivaprakasam, K. and Jayarajan. R. Oyster Mushrooms, Department of Plant Pathology, Tamil Nadu Agricultural University, Coimbatore. 1991.
2. Swaminathan, M. *Food and Nutrition*. Bappco, The Bangalore Printing and Publishing Co. Ltd., No. 88, Mysore Road, Bangalore - 560018. 1990.
3. Nita Bahl*. Handbook on Mushroom*. 4th edition Vijayprimlani for oxford & IBH

publishing co., Pvt., Ltd., New Delhi. Dr.C. Sebastian Rajesekaran Reader in Botany Bishop Heber College, Trichy. 2002.
4. Suman. *Mushroom Cultivation Processing and Uses*, M/s. IBD Publishers and Distributors, New Delhi. 2005.
5. Satyanarayana T and Johri B.N. *Microbial diversity, Current Perspectives and Potential Applications*, IK International. 2005.

Web sources

1. https://www.amazon.in/Mushroom-Cultivation-India-B-C/dp/817035479X
2. http://nrcmushroom.org/book-cultivation-merged.pdf
3. http://agricoop.nic.in/sites/default/files/ICAR_8.pdf
4. http://www.agrimoon.com/mushroom-culture-horticulture-icar-pdf-book/
5. https://books.google.co.in/books/about/Mushroom_Cultivation_in_India.html?id=6AJx99OGTKEC&redir_esc=y

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI

DEPARTMENT OF BOTANY

UG Programme – B.Sc. Botany

SEMESTER - II

SKILL ENHANCEMENT COURSE IV: NON-MAJOR ELECTIVE COURSE: HERBAL MEDICINE (23UBYN22)

(From 2023 - 2024 Batch onwards)

HOURS/WEEK: 2 **INT. MARKS: 25**
CREDITS : 2 **EXT. MARKS: 75**
DURATION : 30 hrs **MAX. MARKS: 100**

Course Objectives

- To understand the nuances of medicinal plants and their phyto-constituents of commercial value.
- To design and develop medicinal garden.
- To apply the knowledge to cultivate medical plants.
- To know the pharmacological importance of medicinal plants.
- To enlist phytochemicals and secondary metabolites of market and commercial value.

Course Outcomes (CO)

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

CO1[K1]: define and describe the principle of cultivation of herbal products

CO2[K2]: explain the phytochemistry of economically important medicinal herbs

CO3[K3]: apply the techniques for evaluation of drug adulteration through biological testing

CO4[K4]: analyse the value added processing / storage / quality control for the better use of herbal medicine

CO5[K5]: develop the skills for cultivation of plants and their value added processing/storage/quality control

CO-PO Mapping table (Course Articulative Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K1]	3	-	-	3	2	1	2
CO2[K2]	3	-	-	2	-	3	2
CO3[K3]	2	-	-	3	-	2	-
CO4[K4]	3	3	3	3	-	2	-
CO5[K5]	2	3	2	-	-	-	3
Weightage of the course	13	06	05	11	02	08	07
Weighted percentage of course contribution to POs	2.35	1.19	1.25	2.51	0.68	2.79	2.26

Based on the level of contribution ('3'-Strong, '2'-Medium, '1'-Low '-' No Correlation)

UNIT I **(6 hrs)**

Importance and Relevance of Herbal drugs in Indian System of Medicine, Pharmacognosy – Aim and scope.

UNIT II **(6 hrs)**

Medicinal gardening – Gardens in the Hills and plains; House gardens; plants for gardening – Poisonous plants – Types of plant poison; action of poisons; treatment for poisons, some poisonous plants; their toxicity and action.

UNIT III **(6 hrs)**

Adulteration of crude drugs and its detection – methods of adulteration; types of adulteration. Medicinal plants of export values; rejuvenating herbs; Medicinal uses of Non-flowering plants.

UNIT IV **(6 hrs)**

Botanical description and active principles of Root drugs (*Asparagus* and *Withania*); Rhizomes woods (Zinger and bamboo) and bark drugs (Cinnamon and Cinchona).

UNIT V **(6 hrs)**

Botanical description and active principles of leaves (*Ocimum*) Flowers (*Catheranthus*); Fruits (Momordica), seed (syzygium) and entire plants as drugs(*Phyllanthus*).

TEXTBOOKS

1. Somasundaram, S. *Medicinal Botany* (Maruthuvar Thavaraviyal) – (Tamil Medium Book). 1997.
2. Wallis, T.E. *Text Books of Pharmacognosy*. J. & A. Churchill Ltd., London. 1967.
3. Jains, S.K. *Medicinal Plants*. Deep Publications, New Delhi. 1996.
4. Srivastava, A.K. *Medicinal Plants*, International Book Distributors, Dehradun. 2006.
5. Agarwal,O.P., *Vol. II, Chemistry of organic – natural products*. S Chand & Company, New Delhi. 1985.
6. Gamble, J.S. and Fisher, *CEC I, II, III Flora of the Presidency*, Madras Volumes. 1921.
7. Mathew K.M., *Flora of the Tamilnadu and Carnatic*. 1988.

REFERENCES

Books

1. Nair, N.C and Henrry, A.N. *Flora of Tamil Nadu, India, Botanical Survey of India*. 1983.

2. Chopra, R.N., Nagar S.L., and Chopra, I.C. *Glossary of Indian Medicinal Plants*. 1956.
3. Chopra, R.N., Chopra, I.C., Handa, K.L., and Kapur L.D., *Indigenous drugs of India*. 1994.
4. Chopra, R.N., Badhuvar R.L and Gosh, G. *Poisonous plants in India*. 1965.
5. Miller, L and Miller, B. *Ayurveda & Aromatherapy: The Earth Essential Guide to Ancient Wisdom and Modern Healing*. Motilal Banarsidass, Fourth edition. 2017.
6. Patri, F and Silano, V. *Plants in cosmetics: Plants and plant preparations used as ingredients for cosmetic products - Volume 1*. ISBN 978-92-871-8474-0, pp 218. 2002.

Web Sources

1. https://www.barnesandnoble.com/b/free-ebooks/nook-books/alternative-medicine-natural-healing/herbal-medicine/_/N-ry0Z8qaZ11iu
2. https://www.springer.com/gp/book/9783540791157
3. https://www.gpatonline.com/gpat/book-reference-pharmacognosy
4. https://www.researchgate.net/publication/334670695_Book_review-Herbal_Drug_Technology
5. http://www.eurekaselect.com/node/173492/herbal-medicine-back-to-the-future

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI

DEPARTMENT OF BOTANY

UG Programme – B.Sc. Botany

SEMESTER - II

SKILL ENHANCEMENT COURSE II: NON-MAJOR ELECTIVE COURSE: GLOBAL CLIMATE CHANGE (23UBYN23)

(From 2023 - 2024 Batch onwards)

HOURS/WEEK:2 **INT.MARKS: 25**
CREDITS : 2 **EXT.MARKS:75**
DURATION : 30 hrs **MAX.MARKS:100**

Course Objectives

- To gain insights on the impact of greenhouse effect on global climate change and mitigation measures.
- To understand the implications of carbon and ecological footprint.
- To apply the knowledge to greenhouse effects.
- To know the rain and its effects on plants.
- To know about Global Environmental change issues.

Course Outcomes (CO)

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

CO1[K1]: relate the anthropogenic pressure on the environment and carbon footprint

CO2[K2]: explain the physical basis of natural green gas house effect on man and materials

CO3[K3]: elucidate the human influenced driver of our climate system and its applications

CO4[K4]: analyze the causes and effects of depletion of the stratospheric ozone layer

CO5[K5]: develop the new strategies for mitigate issues of global environmental change

CO-PO Mapping table (Course Articulative Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1 [K1]	3	-	-	3	2	1	2
CO2[K2]	3	-	-	2	-	3	2
CO3[K3]	2	-	-	3	-	2	-
CO4[K4]	3	3	3	3	-	2	-
CO5[K5]	2	3	2	-	-	-	3
Weightage of the course	13	06	05	11	02	08	07
Weighted percentage of course contribution to POs	**2.35**	**1.19**	**1.25**	**2.51**	**0.68**	**2.79**	**2.26**

Based on the level of contribution ('3'-Strong, '2'-Medium, '1'-Low '-' No Correlation)

UNIT I **(6 hrs)**

Global Environmental change issues. UNFCC, IPCC, Koyoto protocol, CDM, Carbon footprint and ecological footprint.

UNIT II **(6 hrs)**

Stratospheric ozone layer: Evolution of ozone layer; Causes of depletion and consequences; Effects of enhanced UV-B on plants, microbes, animals, human health and materials; Global efforts for mitigation ozone layer depletion.

UNIT III **(6 hrs)**

Climate change: Green house effects; causes; Green house gases and their sources; Consequences of climate, oceans, agriculture, natural vegetation and humans; International efforts on climate change issues.

UNIT IV **(6 hrs)**

Atmospheric deposition: Past and present scenario; Causes and consequences of excessive atmospheric deposition of nutrients and trace elements; Eutrophication.

UNIT V **(6 hrs)**

Acid rain and its effects on plants, animals, microbes and ecosystems.

TEXTBOOKS

1. Adger, N. Brown, K and Conway, D. Global Environmental Change: Understanding the Human Dimensions. The National Academic Press. 2012.
2. Turekian. K. K. Global Environmental Change-Past, Present, and Future. Prentice-Hall. 1996.
3. Eugene Odum,. Fundamentals of Ecology 5th Ed. Cengage, Bengaluru. 2017
4. Sharma P.D. Plant ecology and phytogeography, Rastogi Publications, Meerut. 2019.
5. Neeraj Nachiketa. Environmental & Ecology A Dynamic approach. 2nd Edition GKP Access Publishing. 2018.

REFERENCES

Books

1. Matthew. R.A. Jon Barnett, Bryan McDonald. Global Environmental Change and Human Security. MIT Press., USA. 2009.
2. Hester, R.E and Harrison, R.M. Global Environmental Change. Royal Society of Chemistry. 2002.
3. Keddy, P.A. Plant Ecology: Origins, processes, consequences. 2nd ed. Cambridge University Press. ISBN. 978-1107114234. 2017.
4. Krishnamurthy, K.V. An Advanced Text Book of Biodiversity- Principles and Practices. Oxford and IBH Publications Co. Pvt. Ltd. New Delhi. 2004.
5. Kormondy, E.J. Concepts of Ecology. Prentice Hall, U.S.A. 4th edition. 2017.

Web Sources

1. https://www.ebooks.com/en-us/subjects/the-environment-climate-change-ebooks/2074/
2. http://www.ebooks-for-all.com/bookmarks/detail/Climate-Change/onecat/Electronic-books+Environment-and-nature/0/all_items.html
3. https://www.smashwords.com/books/category/4727/newest/0/free/any
4. https://www.free-ebooks.net/environmental-studies-academic/Global-Warming
5. https://www.nap.edu/catalog/14673/climate-change-evidence-impacts-and-choices-pdf-booklet

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI

DEPARTMENT OF TAMIL

UG PROGRAMME - B.A./ B.COM/B.B.A./ B.SC./BCA

SEMESTER - III

பொதுத்தமிழ் - III (23UTAG31)

(From 2023-2024 Batch onwards)

HOURS / WEEK: 6 **INT. MARKS: 25**
CREDITS : 3 **EXT. MARKS: 75**
DURATION : 90 hrs **MAX. MARKS: 100**

நோக்கங்கள்

- இலக்கியங்களின் சிறப்பினை உணர்த்துதல்.
- காலந்தோறும் எழுந்த காப்பியங்களின் போக்கையும், புதினத்தின் இலக்கிய வடிவத்தையும் யாப்பு, அணி போன்ற இலக்கிய வகைகளையும் மொழிபெயர்ப்புத் திறனையும் மாணவர்கள் உணருமாறு செய்தல்.
- தமிழ் இலக்கியம் சார்ந்த போட்டித் தேர்வுகளுக்கு ஏற்ப கற்பித்தல் நடைமுறைகளை மேற்கொள்ளுதல்.

கற்றலின் விளைவுகள்

CO1[K1]: இலக்கியங்களின் வழி வாழ்வியல் சிந்தனைகள் பற்றி அறிவர்.

CO2[K2]: காப்பிய சமயக் கருத்துக்களையும் நோக்கங்களையும் அடையாளம் காண்பர்.

CO3[K3]: தமிழ் புதினங்களின் வழி சமகாலப் படைப்புகளின் வாழ்க்கை முறையின் ஆற்றலைப் பெறுவர்.

CO4[K4]: காப்பியங்கள் மற்றும் புதினங்களின் வரலாற்றினைப் பாகுபடுத்துவர்.

CO5[K5]: இலக்கிய இலக்கணங்களை கற்று அவற்றை மதிப்பீடு செய்வர்.

CO/PO Mapping Table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K1]	2	1	-	1	-	-	-
CO2[K2]	2	1	-	1	-	-	-
CO3[K3]	2	2	-	2	1	-	-
CO4[K4]	2	2	1	2	-	1	1
CO5[K5]	2	2	1	2	1	1	1
Weightage of the Course	**10**	**8**	**2**	**8**	**2**	**2**	**2**
Weighted percentage of Course Contribution to Pos	**1.81**	**1.59**	**0.5**	**1.83**	**0.68**	**0.7**	**0.65**

Based on the Level of Contribution ('3' -High, '2' -Medium, '1' -Low, '-' No Correlation)

கூறு I **(18Hrs)**

பெருங்காப்பியங்கள்: சிலப்பதிகாரம் - வழக்குரை காதை - இளங்கோவடிகள், மணிமேகலை ஆதிரை பிச்சையிட்ட காதை – சீத்தலைச்சாத்தனார், சீவகசிந்தாமணி – பூமகள் இலம்பகம் - திருத்தக்கதேவர், வளையாபதி – நாதகுந்தனார்.

கூறு II **(18Hrs)**

சமயக் காப்பியங்கள்: பெரியபுராணம் - பூசலார் நாயனார் புராணம் - சேக்கிழார், கம்பராமாயணம் - மந்தரை சூழ்ச்சிப் படலம் - கம்பர், வில்லிபாரதம் - மற்போர் சுருக்கம் - வில்லிப்புத்தூராழ்வார், சீறாப்புராணம் - புலி வசனித்த படலம் - உமறுப்புலவர்.

கூறு III **(18 hrs)**

புதினம்: வஞ்சிமாநகரம் (வரலாற்றுப் புதினம்) – நா.பார்த்தசாரதி.

கூறு IV **(18 hrs)**

காப்பியத்தின் தோற்றமும் வளர்ச்சியும் - புதினத்தின் தோற்றமும் வளர்ச்சியும்

கூறு V **(18 hrs)**

மொழித்திறன்: நூல் மதிப்புரை, திறனாய்வு செய்தல், கடிதம் வரைதல், விண்ணப்பம் எழுதுதல்.

பாடநூல்கள்

1. தமிழியல் துறையினர், *தொகுப்பு நூல்,* ஸ்ரீ காளீஸ்வரி கல்லூரி (தன்னாட்சி), சிவகாசி.
2. வாசுதேவன், கா. *பன்முக நோக்கில் தமிழ் இலக்கிய வரலாறு,* தேவன் பதிப்பகம், திருச்சிராப்பள்ளி, 2017.

பார்வை நூல்கள்

1. சிற்பி. பாலசுப்பிரமணியன், *தமிழ் இலக்கிய வரலாறு,* கவிதா வெளியீடு, சென்னை.
2. தமிழண்ணல், *புதிய நோக்கில் தமிழ் இலக்கிய வரலாறு,* சோலை பதிப்பகம், மதுரை
3. பாக்கியமேரி, *வகைமை நோக்கில் தமிழ் இலக்கிய வரலாறு,* பாரி நிலையம், சென்னை.

வலைப்பதிவுகள் (Web Sources)

1. Tamil Heritage Foundation- www.tamilheritage.org http://www.tamilheritage.org
2. Tamil virtual University Library- www.tamilvu.org/ library http://www.virtualvu.org/library
3. Project Madurai - www.projectmadurai.org.
4. Chennai Library- www.chennailibrary.com http://www.chennailibrary.com
5. Tamil Universal Digital Library- www.ulib.prg http://www.ulib.prg
6. Tamil E-Books Downloads- tamilebooksdownloads. blogspot.com
7. Tamil Books on line- books.tamil cube.com
8. Catalogue of the Tamil books in the Library of British Congress archive.org
9. Tamil novels on line - books.tamilcube.com

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF ENGLISH
UG PROGRAMME - B.A./ B.COM/B.B.A./ B.SC./BCA
SEMESTER- III
GENERAL ENGLISH - III (23UENL31)
(From 2023-2024 Batch onwards)

HOURS/WEEK: 6 (L- 5, T-1) **INT. MARKS: 25**
CREDITS : 3 **EXT. MARKS: 75**
DURATION : 90 hrs **MAX.MARKS: 100**

Course Objectives

- To enhance the level of literary and aesthetic experience of students and to help them respond creatively.
- To sensitize them to the major issues in the society and the world.
- To provide them with an ability to build and enrich their communication skills.
- To equip them to utilize the digital knowledge resources effectively for their chosen fields of study.
- To help them think and write imaginatively and critically.

Course Outcomes (CO)

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

CO1 [K1]: relate and state ideas by reading simple poems and scenes from Shakespearean plays
CO2 [K2]: demonstrate effective speaking skills by listening to speeches of famous personalities and express it in day-to-day life
CO3 [K3]: apply the knowledge of language competency in writing letters, emails and display social etiquettes in everyday life
CO4 [K4]: analyse data interpretation, meeting etiquettes, organizing and Participating in a meeting
CO5 [K5]: develop language skills through literature and assess the knowledge of English in the workplace

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K1]	2	1	-	2	-	-	-
CO2[K2]	2	2	-	2	1	1	-
CO3[K3]	2	2	1	2	1	1	-
CO4[K4]	2	2	1	2	-	-	1
CO5[K5]	2	1	1	1	1	1	1
Weightage of the course	10	08	03	09	03	03	02
Weighted percentage of Course contribution to POs	**1.81**	**1.59**	**0.5**	**1.83**	**0.68**	**0.7**	**0.65**

Based on the level of contribution ('3'-High, '2'-Medium, '1'-Low '-' No Correlation)

UNIT I - SPEECHES OF FAMOUS PERSONALITIES **(18 hrs)**

Jawaharlal Nehru	-	Tryst with Destiny
Steve Jobs	-	You've got to Find What You Love
Barack Obama	-	Yes, We Can

UNIT II- POETRY **(18 hrs)**

Christina Rossetti	-	In an Artist's Studio
Toru Dutt	-	Sita
Oodgeroo Noonuccal	-	A Song of Hope
Mamang Dai	-	The Voice of the Mountains

UNIT III - SCENES FROM SHAKESPEARE **(18 hrs)**

Romeo & Juliet	-	The Balcony Scene
Macbeth	-	Banquet Scene
Julius Caesar	-	Murder Scene

UNIT IV - LANGUAGE COMPETENCY **(18 hrs)**

Writing letters and emails
Writing and messaging in social media platforms [blogs, twitter, Instagram, facebook]
Learning netiquette, email etiquette

UNIT V - ENGLISH FOR WORK PLACE **(18 hrs)**

Data Interpretation and Reporting
Data Presentation and analysis
Meeting Etiquettes - language, dress code, voice modulation
Online Meetings - Terms and expressions used
Conducting and participating in a meeting

TEXTBOOKS

1. Arden Shakespeare*: Complete works of William Shakespeare*. Bloomsbury, 2011.

REFERENCES

Books

1. Wells, Stanley. *The Shakespeare Book: Big Ideas Simply Explained*, et al. DK Publishing, 2015.
2. Gandhi, Mahatma. *Famous Speeches by Mahatma Gandhi*, Create space Independent Publishing Platform, 2016.
3. Bernish, Jeanne Kelly. *How to Build a Professional Digital Profile* Kindle Edition, Bernish Communications Associates, LLC; 1st edition. 2012.
4. Folse, Keith.S. *Keys to Teaching Grammar to English Language Learners*, Second Ed.: A Practical Handbook, Michigan Teacher Training, 2016.
5. Yardley, Krysia.M. *Role Play- Theory and Practice*. Matwiejczuk, SAGE publications ltd, 1997.

Web Sources

1. https://www.scribd.com/document/558838656/
2. http://www.wordslikethis.com.au/
3. https://www.poetryfoundation.org/poems/146804/in-an-artist39s-studio
4. https://www.poetrynook.com/poem/s%E2%94%9C%C2%ABta
5. https://www.cam.ac.uk/files/a-tryst-with-destiny/index.html#:~:text=Jawaharlal%20Nehru%2C%20delivering%20his%20Tryst%20with%20Destiny%20speech.&text=%22Long%20years%20ago%20we%20made,awake%20to%20life%20and%20freedom

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI

DEPARTMENT OF BOTANY

UG Programme – B.Sc. Botany

SEMESTER – III

CORE COURSE – V: PLANT DIVERSITY III - BRYOPHYTES AND PTERIDOPHYTES (23UBYC31)

(From 2023-2024 Batch onwards)

HOURS/WEEK: 4 **INT. MARKS: 25**

CREDITS : 4 **EXT. MARKS: 75**

DURATION : 60 hrs **MAX. MARKS: 100**

Course Objectives

- To enable the students to have an overview of Non-vascular and Vascular cryptogams..
- To understand the morphological diversity of Bryophytes and Pteridophytes.
- To know the evolution of Bryophytes and Pteridophytes.
- To understand the economic importance of the Bryophytes and Pteridophytes.
- To understand anatomy and reproduction of Bryophytes and Pteridophytes

Course Outcomes (CO)

On successful completion of the course, the learners will able to

CO1[K1]: recognize morphological variations of Bryophytes and Pteridophytes.

CO2[K2]: explain the anatomy and reproduction of Bryophytes and Pteridophytes

CO3[K3]: compare and contrast the variations in the internal cellular organization, gametophyte and sporophyte of Bryophytes and Pteridophytes

CO4[K4]: decipher the stages of plant evolution and their transition to land habitat

CO5[K5]: access the useful role of Bryophytes and Pteridophytes

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K1]	3	3	2	3	2	-	-
CO2[K2]	3	3	3	2	3	-	2
CO3[K3]	3	2	3	2	1	-	-
CO4[K4]	3	3	3	3	3	2	-
CO5[K5]	3	3	2	2	2	1	2
Weightage of the course	15	14	14	12	11	03	05
Weighted percentage ofCourse contribution to Pos	**2.71**	**2.98**	**3.51**	**2.74**	**3.73**	**1.05**	**1.61**

Based on the level of contribution ('3'-High, '2'-Medium, '1'-Low '-' No Correlation)

UNIT I **(12 hrs)**

BRYOPHYTES: General characters of Bryophytes, classification (Watson, 1971) (up to family). Economic importance of Bryophytes – Ecological importance (Pollution indicators and monitoring), Medicinal uses, horticulture, industrial uses and absorbent bandages

UNIT II **(12 hrs)**

Structure, reproduction and life histories of the following classes each with a suitable example: Hepaticopsida (*Riccia*/*Marchantia*); Anthocerotopsida (*Anthoceros*) and Bryopsida (*Funaria*/*Polytrichum*). (Examples may be changed according to the availability of the specimens). Evolution of Bryophytes

UNIT III **(12 hrs)**

PTERIDOPHYTES General Characters of Pteridophytes - Classification (Reimer, 1954). Apogamy and apospory, homospory and heterospory.

UNIT IV **(12 hrs)**

Morphology, anatomy and reproduction of reproduction of the taxa belonging to each of the following classes: Psilotopsida (*Psilotum*), Lycopsida (*Lycopodium/Selaginella*), Sphenopsida (*Equisetum*), Pteropsida (*Adiantum*/*Marsilea*). (Examples may be changed according to the availability of the specimens).

UNIT V **(12 hrs)**

Origin and evolution of Pteridophytes. Stelar Evolution. Economic importance of Pteridophytes.

TEXTBOOKS

1. Sharma,O.P. *Bryophyta*, MacMillan India Ltd. Delhi. 2017.
2. Alam, *A. Contemporary Research on Bryophytes Book Series:* Recent Advances in Botanical Science. 10.2174/9789811433788120010l. 2020.
3. Alain Vanderpoorten. *Introduction to Bryophytes,* 1st Edition, Cambridge University Press. 2009.
4. Chopra, R. N. *Biology of bryophytes*. New Age International (P) Ltd. New Delhi, India. 2005.
5. Prem Puri. *Bryophytes– morphology growth and differentiation.* Atma Ram & Sons. Lucknow, India. 2001.

REFERENCES

Books

1. Eames, A. *Morphology of lower vascular plant*. McGraw Hill, Chennai. 1963.
2. Parihar. N.S.. *An introduction of Embryophyta, Vol.III – Pteriodophyta,* Central book depot, Allahabad. 1967.
3. Smith, G.M.. *Cryptogamic Botany, Volume-II*– McGraw Hill, Chennai, 1955.
4. Sporne, K.L.. *Morphology of Pteridophytes,* 4th edition, B.I. Publication. Chennai. 1976.
5. Watson, E.V. *The structure and Life of Bryophytes.* Hutchinson & Co, UK. 1963.

6. Parihar, N.S. *Bryophytes.* Central Book Depot, Allahabad. 1991.
7. Parihar, N.S. *The Biology and Morphology of Pteridophytes*, .Central Book Depot, Allahabad. 1996..

Web Sources

1. http://www.bryoecol.mtu.edu/
2. https://www.amazon.in/Introduction-Bryophytes-Alain-Vanderpoorten-ebook/dp/B007NWFWQK
3. http://scitec.uwichill.edu.bb/bcs/bl14apl/bryo1.htm
4. http://www.bsienvis.nic.in/Database/Pteridophytes-in-India_23432.aspx
5. http://www.botany.ubc.ca/bryophyte/mossintro.htmlaeTIUC&redir_esc=y

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI

DEPARTMENT OF BOTANY
UG Programme – B.Sc. Botany
SEMESTER – III
CORE COURSE – VI: PRACTICAL: PLANT DIVERSITY III - BRYOPHYTES AND PTERIDOPHYTES - (23UBYC3P)
(From 2023-2024 Batch onwards)

HOURS/WEEK: 4 **INT. MARKS: 25**
CREDITS : 4 **EXT. MARKS: 75**
DURATION : 60 hrs **MAX. MARKS:100**

Course Objectives

- To enable students gain expertise in hand sectioning technique.
- To study diversity of Bryophytes and Pteridophytes.
- To understand the anatomical structure of the Bryophytes and Pteridophytes.
- Develop comprehensive skills in sectioning and micro preparation.
- Describe the structure of fossil forms prescribed in the syllabus

Course Outcomes (CO)

On successful completion of the course, the learners will able to

CO1[K2]: recognize the major groups of Non-vascular and Vascular cryptogams
CO2[K3]: describe the structure of Bryophytes and Pteridophytes forms prescribed in the syllabus.
CO3[K4]: identify and illustrate the morphological and anatomical features of bryophytes and Pteridophytes
CO4[K5]: develop comprehensive skills in sectioning and micro preparation
CO5[K6]: interpret the significance of reproductive structures in Bryophytes and Pteridophytes.

CO-PO Mapping table (Course Articulation Matrix)

CO / PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K2]	3	2	3	3	2	-	-
CO2[K3]	3	3	3	2	3	1	02
CO3[K4]	3	3	3	3	1	-	1
CO4[K5]	3	3	3	3	3	-	1
CO5[K6]	3	3	2	3	2	1	-
Weightage of the course	15	15	14	14	11	02	04
Weighted percentage ofCourse contribution to Pos	**2.71**	**2.98**	**3.51**	**3.2**	**3.73**	**0.7**	**1.29**

Based on the level of contribution ('3'-High, '2'-Medium, '1'-Low '-' No Correlation)

EXPERIMENTS

Bryophytes

1. Study of morphology, anatomy and structure of the vegetative and reproductive organs of Bryophytes genera included in the theory syllabus.
2. Hepaticopsida *Riccia*/*Marchantia*); Anthocerotopsida (*Anthoceros*) and Bryopsida (*Funaria*/*Polytrichum*) (Examples may be changed according to the availability of the specimens) (need not study developmental aspects).

Pteridophytes

3. Study of morphology, anatomy and structure of the vegetative and reproductive organs of Pteridophytes genera and fossils included in the theory syllabus.
   Psilotopsida (*Psilotum*), Lycopsida (*Lycopodium/Selaginella*), Sphenopsida (*Equisetum*), Pteropsida (*Adiantum*/*Marsilea*). (Examples may be changed according to the availability of the specimens).
4. Identifying the micro slides relevant to the syllabus.
5. Botanical excursion.

TEXTBOOKS

1. Sharma,O.P. *Bryophyta*,MacMillanIndia Ltd,NewDelhi. 2017.
2. Sharma,O.P. *Pteridophyta*,Tata McGraw-Hills Ltd,NewDelhi. 2012.
3. Ashok, M. Bendre and Kumar. *A text book of Practical Botany, Algae, Fungi, Lichen, Bryophyta, Pteridophyta, Gymnosperms and Palaeobotany. Revised edition.* Published by Rakesh Kumar Rastogi publication. 2010.
4. Prem Puri. 2001. *Bryophytes– morphology growth and differentiation.* Atma Ram & Sons. Lucknow, India.
5. Tuba Z., Slack N.G. and Stark L.R *Bryophyte Ecology and Climate Change.* Cambridge University press, Cambridge. . 2011.

REFERENCES

Books

1. Ashok, M. Bendre and Kumar. *A text book of Practical Botany, Algae, Fungi, Lichen, Bryophyta, Pteridophyta, Gymnosperms and Palaeobotany.* Revised edition. Published by Rakesh Kumar Rastogi publication 2010.
2. Mohammed Gufran Khan, Shite Gatew and Bedilu Bekele.. *Practical manual for Bryophytes and Pteridophytes*. Lambert Academic Publishing,2012
3. Puri, P. *Bryophytes,* Atma Ram and Sons, New Delhi, 1980.
4. Sporne, K.R. The Morphology of Pteridophytes. B.I. Publ. Pvt. Ltd. Chennai, 1991.
5. Vashista.P.C. Botany for Degree students: Pteridophyta. S.Chand & Co. New Delhi. 1971.

Web Sources

1. https://www.amazon.in/Manual-Practical-Bryophyta-Suresh-Kumar/dp/B0072GNFX4
2. https://www.amazon.in/Practical-Manual-Pteridophyta-Rajan-Sundara/dp/8126106883
3. http://www.eeb.uconn.edu/people/goffinet/Classificationmosses.html
4. https://www.vitalsource.com/products/introduction-to-bryophytes-alain-vanderpoorten-v9780511738951?duration=perpetual
5. https://www.toppr.com/guides/biology/plant-kingdom/pteridophytes/

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF BOTANY
UG Programme – B.Sc. Botany
SEMESTER- III
ELECTIVE COURSE GENERIC / DECIPINE SPECIFIC – III: CHEMISTY FOR BIOLOGICAL SCIENCES – I (23UBYA31)

(From 2023-2024 Batch onwards)

HOURS/WEEK: 4 **INT. MARKS: 25**
CREDITS : 3 **EXT. MARKS: 75**
DURATION : 60 hrs **MAX. MARKS:100**

Course Objectives

- To know the basics of atomic orbitals, chemical bonds, hybridization and fundamentals of organic chemistry
- To get knowledge on nuclear and industrial chemistry
- To ensure the importance of specialty drugs
- To acquire knowledge in the separation and purification techniques
- To understand reaction mechanism

Course Outcomes (CO)

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

CO1[K1]: describe the principles chemical bonding, nuclear chemistry, thermodynamics and hybridization of organic compounds.
CO2[K2]: explain the concepts involved in Fuels, drugs and analytical chemistry
CO3[K3]: Find out the use of isotopes, fertilizers and reaction mechanism
CO4[K4]: analyze the MO theory, silicones, heterocyclic and Anesthetics
CO5[K5]: evaluate the application of chromatography, radioisotopes and drugs

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K1]	3	2	1	-	-	1	-
CO2[K2]	3	2	1	1	-	-	-
CO3[K3]	2	2	1	1	1	1	1
CO4[K4]	3	2	1	1	-	-	1
CO5[K5]	2	2	1	1	1	1	-
Weightage of the course	13	10	05	04	02	03	02
Weighted percentage of Course contribution to POs	**2.35**	**1.99**	**1.25**	**0.91**	**0.68**	**1.05**	**0.65**

Based on the level of contribution ('3'-High, '2'-Medium, '1'-Low '-' No Correlation)

UNIT I – CHEMICAL BONDING AND NUCLEAR CHEMISTRY (12 hrs)

Chemical Bonding: Molecular Orbital Theory – Bonding, Antibonding and Non-Bonding Orbitals. M. O Diagrams for Hydrogen, Helium, Nitrogen; Discussion of Bond Order and Magnetic Properties. **Nuclear Chemistry:** Fundamental Particles – Isotopes, Isobars, Isotones and Isomers – Differences between Chemical Reactions and Nuclear Reactions – Group Displacement Law. Nuclear Binding Energy – Mass Defect – Calculations. Nuclear Fission and Nuclear Fusion – Differences – Stellar Energy. Applications of Radioisotopes – Carbon Dating, Rock Dating and Medicinal Applications.

UNIT II – INDUSTRIAL CHEMISTRY (12 hrs)

Fuels: Fuel Gases: Natural Gas, Water Gas, Semi Water Gas, Carbureted Water Gas, Producer Gas, CNG, LPG And Oil Gas (Manufacturing Details Not Required). **Silicones:** Synthesis, Properties and Uses of Silicones. **Fertilizers:** Urea, Ammonium Sulphate, Potassium Nitrate NPK Fertilizer, Superphosphate, Triple Superphosphate.

UNIT III – FUNDAMENTALS CONCEPTS IN ORGANIC CHEMISTRY (12 hrs)

Hybridization: Orbital Overlap, Hybridization and Geometry of CH4, C2H4, C2H2 and C6H6. Polar Effects: Inductive Effect and Consequences on Ka and Kb of Organic Acids and Bases, Electromeric, Mesomeric, Hyper Conjugation and Steric – Examples and Explanations. **Reaction Mechanisms:** Types of Reactions – Aromaticity – Aromatic Electrophilic Substitution; Nitration, Halogenation, Friedel – Craft's Alkylation and Acylation. Heterocyclic Compounds: Preparation, Properties of Pyrrole and Pyridine.

UNIT IV – DRUGS AND SPECIALITY CHEMICALS (12 hrs)

Definition, Structure and uses: Antibiotics viz.,Penicillin, Chloramphenicol And Streptomycin; Anaesthetics viz., Chloroform And Ether; Antipyretics viz., Aspirin, Paracetamol And Ibuprofen; Artificial Sweeteners viz., Saccharin, Aspartame And Cyclamate; Organic Halogen Compounds Viz., Freon, Teflon.

UNIT V – ANALYTICAL CHEMISTRY (12 hrs)

Introduction to Qualitative and Quantitative Analysis. Principles of Volumetric Analysis. Separation and Purification Techniques – Extraction, Distillation and Crystallization. Chromatography: Principle and Application of Column, Paper and Thin Layer Chromatography

TEXTBOOKS

1. Veeraiyan V, *Textbook of Ancillary Chemistry*, 1st Edition, High Mount Publishing House: Chennai, 2009
2. Vaithiyanathan S, *Textbook of Ancillary Chemistry*, Priya Publications: Karur, 2006.
3. Bahl B. S, Arul Bhal, *Advanced Organic Chemistry*, 23rd Edition, S. Chand and company: New Delhi, 2012.
4. Soni P. L and Chawla H M. *Textbook of Organic Chemistry*, 29th Edition, New Delhi: Sultan Chand & Sons, 2007.

REFERENCES

Books

1. Soni P. L and Mohan Katyal, Textbook of Inorganic Chemistry, 20th Edition, Sultan Chand & amp; Sons, 2007.
2. Puri B. R, Sharma L. R, Pathania M. S, *Textbook of Physical Chemistry,* 44th Edition, Vishal Publishing Co: New Delhi, 2018.
3. Sharma B. K. *Industrial Chemistry*. 16th Edition, Goel Publishing House: Meerut, 2014.

Web Sources

1. https://www.youtube.com/watch?v=daPAcFFSFdY&list=PLF_7kfnwLFCGzzyaPRyNjSXRRR7W_qmny
2. https://www.youtube.com/watch?v=q5CZUnsWkYQ&list=PLF_7kfnwLFCFijVGjd7zrjtWrxi4-4xeY
3. https://youtu.be/DGYwnbboTtI

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF CHEMISTRY
UG Programme – B.Sc Botany
SEMESTER III
ELECTIVE COURSE GENERIC / DISCIPLINE SPECIFIC – III: PRACTICAL: CHEMISTY PRACTICAL FOR BIOLOGICAL SCIENCES – I (23UBYA3P)
(From 2023-2024 Batch onwards)

HOURS/WEEK: 2 **INT. MARKS: 25**
CREDITS : 2 **EXT. MARKS: 75**
DURATION : 30 hrs **MAX. MARKS: 100**

Course Objectives

- To know the safety in chemistry lab
- To get an idea to handle the glassware
- To understand the basic principle of volumetric analysis
- To acquire knowledge to prepare solutions
- To have hands on experience in the volumetric analysis

Course Outcomes (CO)

On successful completion of the course, the learners will be able to
CO1[K2]: estimate oxalic acid by acidimetric and permanganometric method
CO2[K3]: choose suitable indicator for carrying out volumetric estimation
CO3[K4]: apply acidimetric and alkalimetric method for the quantitative volumetric estimation of acids and bases
CO4[K5]: measure quantitatively the amount of inorganic compound accurately with the help of color change of the indicator
CO5[K6]: plan various volumetric procedures for the estimation of any inorganic compounds

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K2]	3	2	1	-	-	-	1
CO2[K3]	3	2	1	1	-	1	-
CO3[K4]	3	2	1	-	-	1	-
CO4[K5]	2	2	1	1	1	1	1
CO5[K6]	2	2	1	-	1	1	1
Weightage of the course	13	10	05	02	02	04	03
Weighted percentage of Course contribution to POs	**2.35**	**1.99**	**1.25**	**0.46**	**0.68**	**1.39**	**0.97**

Based on the level of contribution ('3'-High, '2'-Medium, '1'-Low '-' No Correlation)

VOLUMETRIC ANALYSIS

1. Estimation of Sodium Hydroxide using Standard Sodium Carbonate.
2. Estimation of Hydrochloric Acid using Standard Oxalic Acid.
3. Estimation of Ferrous Sulphate using Standard Mohr's Salt.
4. Estimation of Oxalic Acid using Standard Ferrous Sulphate.
5. Estimation of Potassium Permanganate using Standard Sodium Hydroxide.
6. Estimation of Magnesium using EDTA.
7. Estimation of Ferrous Ion using Diphenyl Amine as Indicator.

TEXTBOOK

1. Venkateswaran V, Veerasamy R, Kulandaivalu A. R, Basic Principles of Practical Chemistry, 2nd Edition, Sultan Chand & Sons, 1997.

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI

DEPARTMENT OF BOTANY

UG Programme – B.Sc. Botany

SEMESTER – III

SKILL ENHANCEMENT COURSE - V: (ENTREPRENEURIAL SKILL) - ENTREPRENEURIAL OPPORTUNITIES IN BOTANY (23UBYS31)

(From 2023-2024 Batch onwards)

HOURS/WEEK: 1 **INT. MARKS: 25**
CREDIT : 1 **EXT. MARKS: 75**
DURATION : 15 hrs **MAX. MARKS:100**

Course Objectives:

- To enable students to understand about establishment of various ventures after graduates in Botany using medicinal plants, Biotechniques and marketing of bioproducts.
- To create a mindset among students to start their own companies for income generation.
- The students may understand about various fields of botany.
- To develop the concept of Entrepreneurial Opportunities in Botany
- Describe the new strategies to describe marketing and business management strategy.

Course outcomes:

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

CO1[K1]: relate to how various fields of botany could be understood with an entrepreneurial approach

CO2[K2]: explain the concept of Entrepreneurial Opportunities in Botany

CO3[K3]: make of the knowledge gained to start new venture using Plant tissue culture and plant products for commercial exploitations

CO4[K4]: decipher effective ways of making bio products like organic acids, solvents, beverages, enzymes, antibiotics, mushrooms, biogas and etc

CO5[K5]: develop new strategies to describe marketing and business management strategy including the role of IPR and bioethics regulations for licensing

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K1]	3	3	1	1	2	-	-
CO2[K2]	3	3	2	2	3	-	1
CO3[K3]	2	2	3	1	2	2	1
CO4[K4]	3	3	1	2	3	1	2
CO5[K5]	3	3	2	3	1	-	-
Weightage of the course	13	13	09	09	11	03	04
Weighted percentage of Course contribution to Pos	**2.35**	**2.58**	**2.26**	**2.05**	**3.73**	**1.05**	**1.29**

Based on the level of contribution ('3'-High, '2'-Medium, '1'-Low '-' No Correlation)

UNIT I **(3 hrs)**

INTRODUCTION TO ENTREPRENEURSHIP: Introduction to Entrepreneurship, Scope and identification of new ventures using plant resources, Mechanism of product selection and commercialization, General concept about the Govt. formalities, rules & regulation, Entrepreneurship skill development.

UNIT II **(3 hrs)**

TOOLS AND TECHNIQUES: Production of commercially viable plants through Plant tissue culture technique, Production of secondary metabolites, solvents, organic acids, beverages, enzymes, antibiotics.

UNIT III **(3 hrs)**

NEW VENTURE CREATION: Production of Biofertilizers, Vermicompost, Establishment of medicinal, herbal and zodiac gardens, Terrace & Kitchen garden, Spirulina and Azolla cultivation, Mushroom cultivation, Bonsai, Bouquet making, Terrarium.

UNIT IV **(3 hrs)**

PRODUCT DEVELOPMENT AND COMMERCIALIZATION: Product commercialization and business strategy, Dyes, Cosmetics and Perfumes, Gums, Resins & Latex, Areca Leaf Plates, cups & bags, Jute Products.

UNIT V **(3 hrs)**

BIO-BUSINESS PLANS, IPR AND BIOETHICS: Marketing and Business management strategy, Bank loan, Intellectual property rights, Patent laws - Bioethics and current legal issues, Marketing and public perceptions in product development – Technology licensing and branding concerns

TEXTBOOKS

1. Gurinder Shahi. *Bio-Business in Asia: How countries Can Capitalize on the Life Science Revolution,* Pearson Prentice Hall, New Delhi, India, 2004.
2. Karthikeyan, S. and Arthur Ruf. *Biobusiness,* MJP Publications. Chennai, India, 2009.
3. Richard Oliver. *The coming Biotech age: The Business of Biomaterials,* McGraw Hill Publications, New York, USA, 2000.
4. Adams, C.R. Banford, K.M. and Early, M.P.*.. Principles of Horticulture*, 1993
5. Sathe,T.V *Vermiculture and Organic farming*, Daya Publishers, 2004.

REFERENCES

Books

1. Robin Lowe and Sue Marriott Enterprise*: Entrepreneurship and Innovation: Concepts, Contexts and Commercialization,* Routledge Publisher, London, UK, 2009.
2. Peter F.Drucker,*. Innovation and Entrepreneurship*, Harper Collins Publisher, New York, US. 2009
3. Russell, T. *Nature Guide: Trees: The world in your hands(Nature Guides).*

Mukherjee D. Gardening in India, Oxford IBH publishing co, New Delhi, 2012.
4. Kumar, N.. *Introduction to Horticulture*, Rajalakshmi Publications, Nagercoil, 1997.
5. Webster,J and Weber,R. IntroductiontoFungi,3rdEd.CambridgeUniversityPress, Cambridge, 2007.

Web Sources

1. https://www.brainkart.com/article/Entrepreneurial-Botany_38321/
2. https://www.youtube.com/watch?v=hnBla1FfcLo
3. https://www.slideshare.net/krishnashah5891004/ram-power-point-presentation
4. http://www.brainkart.com/article/Economically-Useful-Plants-andEntrepreneurial-Botany_38301
5. https://www.ebooks.com/en-us/subjects/gardening/
6. https://www.amazon.in/Preservation-Techniques-Publishing-Technology-Nutrition-ebook/dp/B00RXCXB3Q

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI

DEPARTMENT OF BOTANY

UG Programme – B.Sc. Botany

SEMESTER – III

SKILL ENHANCEMENT COURSE – VI: HERBAL TECHNOLOGY (21UBYS32)

(From 2023-2024 Batch onwards)

HOURS/WEEK: 2 **INT. MARKS: 25**
CREDITS : 2 **EXT. MARKS: 75**
DURATION : 30 hrs **MAX. MARKS: 100**

Course Objectives

- To provide students with knowledge of herbal drug industry, the quality of raw material, and guidelines for quality maintenance.
- To gain an insight into the commercially important secondary products and significance of bioprospecting.
- To understand various plants based drugs used in ayurvedha, unani, homeopathy, siddha etc.
- To apply the knowledge to cultivate medical plants.
- To know the pharmacological importance of medicinal plants.

Course Outcomes

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

CO1[K1]: define and describe the principle of cultivation of herbal products
CO2[K2]: list the major herbs, their botanical name and chemical constituents
CO3[K3]: apply techniques for monitoring drug adulteration through the biological testing
CO4[K4]: analyze and decipher the significance of various methods of harvesting, drying and storage of medicinal herbs
CO5[K5]: develop the skills for cultivation of plants and their value added processing / storage

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K1]	3	3	3	3	3	2	1
CO2[K2]	3	3	2	3	3	-	-
CO3[K3]	2	2	2	3	3	-	1
CO4[K4]	2	2	2	3	3	2	-
CO5[K5]	3	2	2	3	3	-	2
Weightage of the course	13	12	11	15	15	04	04
Weighted percentage ofCourse contribution to Pos	**2.35**	**2.39**	**2.76**	**3.42**	**5.08**	**1.39**	**1.29**

Based on the level of contribution ('3'-High, '2'-Medium, '1'-Low '-' No Correlation)

UNIT I **(6 hrs)**

Herbal Technology: Definition and scope; Herbal medicines: history and scope; Traditional systems of medicine, and overview of AYUSH (Traditional Indian Systems of Medicine); Cultivation - harvesting - processing - storage of herbs and herbal products.

UNIT II **(6 hrs)**

Value added plant products: Herbs and herbal products recognized in India; Major herbs used as herbal medicines, nutraceuticals, cosmeticals and biopesticides, their Botanical names, plant parts used, major chemical constituents.

UNIT III **(6 hrs)**

Pharmacognosy - Systematic position, botany of the plant part used and active principles of the following herbs: Tulsi, Ginger, Curcuma, Fenugreek, Indian Gooseberry, Catharanthus roseus, Withania somnifera, Centella asiatica, Achyranthes aspera, Kalmegh, Giloe (Tinospora), Saravar. Herbal foods, future of pharmacognosy.

UNIT IV **(6 hrs)**

Analytical pharmacognosy: Morphological and microscopic examination of herbs, Evaluation of drug adulteration - types, methods of drug evaluation - Biological testing of herbal drugs - Phytochemical screening tests for secondary metabolites (alkaloids, flavonoids, steroids, triterpenoids, phenolic compounds).

UNIT V **(6 hrs)**

Plant gene banks, Cultivation of Plants and their value added processing / storage / quality control for use in herbal formulations, Introductory knowledge of Tissue culture and Micro propagation of some medicinal plants (*Withania somnifera*, neem and tulsi),

Recommended Texts

1. AYUSH (www.indianmedicine.nic.in). *About the systems—An overview of Ayurveda, Yoga and Naturopathy, Unani, Siddha and Homeopathy.* New Delhi: Department of Ayurveda, Yoga and Naturopathy, Unani, Siddha and Homoeopathy (AYUSH), Ministry and Family Welfare, Government of India.
2. Evans, W.C. Trease and Evans *Pharmacognosy.* 16th Edition, SAUNDERS / Elsevier. 2009:
3. Sivarajan, V.V. and India, B. *Ayurvedic Drugs and Their Plant Sources..* Oxford & IBH
4. Publishing Company, - Herbs - 570 pages. . 1994
5. Miller, L. and Miller, B. *Ayurveda & Aromatherapy,* The Earth Essential Guide to Ancient Wisdom and Modern Healing. Motilal Banarsidass,; Fourth edition, 2017
6. Kokate, C.K.. *Practical Pharmacognosy*. Vallabh Prakashan, Pune. 2003.

REFERENCES

Books

1. Agarwal, P., Shashi, Alok., Fatima, A. and Verma, A. 2013. Current scenario of Herbal Technology worldwide: An overview. Int J Pharm Sci Res; 4(11): 4105-17.
2. Arbe r, Agnes. 1999. Herbal Plants and Drugs. Mangal Deep Publications, Jaipur.
3. Varzakas, T., Zakynthinos, G, and Francis Verpoort, F. 2016. Plant Food Residues as a Source of Nutraceuticals and Functional Foods. Foods 5 : 88.
4. Aburjai, T. and Natsheh, F.M. 2003. Plants Used in Cosmetics. Phytotherapy Research 17 :987-1000.
5. Patri, F. and Silano, V. 2002. Plants in cosmetics: Plants and plant preparations used as ingredients for cosmetic products - Volume 1. ISBN 978-92-871-8474-0, pp 218.

Web Sources

1. https://www.kopykitab.com/Herbal-Science
2. https://kadampa.org/books/free-ebook-download-howtotyl?gclid=CjwKCAiA6vXwBRBKEiwAYE7iS5t8yenurClUCTdV9olKo9TbyAh4fsoFqPYWGs5qBTbytD22z7lo0BoCYnUQAvD_BwE
3. https://www.barnesandnoble.com/b/free-ebooks/nook-books/alternative-medicine-natural- healing/herbal-medicine/_/N-ry0Z8qaZ11iu
4. http://cms.herbalgram.org/heg/volume8/07July/HerbalEBooks.html?t=1310004932&ts=1579066352&signature=1dd0d5aef818b19bcdcd6c063a78e404
5. https://www.dattanibookagency.com/books-herbs-science.html
6. https://www.springer.com/gp/book/9783540791157

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF TAMIL
UG PROGRAMME - B.A./ B.COM/B.B.A./ B.SC./BCA
SEMESTER - IV
பொதுத்தமிழ் - IV (23UTAG41)
(From 2023-2024 Batch onwards)

HOURS / WEEK : 6 **INT. MARKS: 25**
CREDITS : 3 **EXT. MARKS: 75**
DURATION : 90 hrs **MAX. MARKS: 100**

நோக்கங்கள்

- இலக்கியங்களின் சிறப்பினை உணர்த்துதல்.
- சங்க இலக்கியத்தின் சிறப்பையும், நாடகம் என்னும் இலக்கிய வகையின் தன்மையையும் அகபுற இலக்கணங்களையும் மாணவர்களுக்கு அறிமுகப்படுத்துதல்.
- தமிழ் இலக்கியம் சார்ந்த போட்டித் தேர்வுகளுக்கு ஏற்ப கற்பித்தல் நடைமுறைகளை மேற்கொள்ளுதல்.

கற்றலின் விளைவுகள்

CO1[K1]: சங்க இலக்கியத்தில் காணப்பெறும் அறக்கருத்துக்களை அறிந்து கொள்வர்.

CO2[K2]: சங்க இலக்கியங்கள் மற்றும் நாடக இலக்கியம் வாயிலாக மக்களின் வாழ்க்கை முறையினை எடுத்துரைப்பர்.

CO3[K3]: நாடக இலக்கியம் மூலம் நடிப்பாற்றலையும், கலைத்தன்மையையும், படைப்பாற்றலையும் கற்பர். மேலும் மொழிபெயர்ப்பு ஆற்றலையும் பெறுவர்.

CO4[K4]: கலைச்சொற்களைக் கண்டறிந்து அவற்றோடு தொடர்புடைய சொல்லைப் பகுப்பர்.

CO5[K5]: சங்க இலக்கியம் மற்றும் நாடக இலக்கியங்களை மதிப்பீடு செய்வர்.

CO/PO Mapping Table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K1]	2	1	-	1	-	-	-
CO2[K2]	2	1	-	2	-	-	-
CO3[K3]	2	2	-	2	1	-	1
CO4[K4]	2	2	1	2	1	1	-
CO5[K5]	2	2	1	2	-	1	1
Weightage of the Course	10	8	2	9	2	2	2
Weighted percentage of Course Contribution to POs	1.81	1.59	0.5	2.05	0.68	0.7	0.65

Based on the Level of Contribution ('3' -High, '2' -Medium, '1' -Low, '-' No Correlation)

கூறு I **(18 hrs)**

எட்டுத்தொகை: நற்றிணை (10,14,16பாடல்கள்), குறுந்தொகை (16,17,19,20,25,29,38,440), கலித்தொகை (38,51), அகநானூறு (15,33,55), புறநானூறு (37,86,112), பரிபாடல் (55)

கூறு II **(18 hrs)**

பத்துப்பாட்டு: நெடுநல்வாடை - நக்கீரர்

கூறு III **(18 hrs)**

நாடகம்: சபாபதி - பம்மல் சம்பந்த முதலியார்

கூறு IV **(18 hrs)**

சங்க இலக்கியம் தோற்றம் வளர்ச்சி - நாடகத்தின் தோற்றம் வளர்ச்சி

கூறு V **(18 hrs)**

மொழித்திறன்: மொழிபெயர்ப்பு - கலைச்சொற்கள், கொடுக்கப்பட்டுள்ள ஆங்கிலப் பகுதியைத் தமிழில் மொழிபெயர்தல், அலுவலகக் கடிதம் - தமிழில் மொழிபெயர்த்தல்.

பாடநூல்கள்

1. தமிழியல் துறையினர், *தொகுப்பு நூல்,* ஸ்ரீ காளீஸ்வரி கல்லூரி (தன்னாட்சி), சிவகாசி.
2. வாசுதேவன், கா. *பன்முக நோக்கில் தமிழ் இலக்கிய வரலாறு,* தேவன் பதிப்பகம், திருச்சிராப்பள்ளி, 2017.

பார்வை நூல்கள்

1. சிற்பி. பாலசுப்பிரமணியன், *தமிழ் இலக்கிய வரலாறு,* கவிதா வெளியீடு, சென்னை.
2. தமிழண்ணல், *புதிய நோக்கில் தமிழ் இலக்கிய வரலாறு,* சோலை பதிப்பகம், மதுரை
3. பாக்கியமேரி, *வகைமை நோக்கில் தமிழ் இலக்கிய வரலாறு,* பாரி நிலையம், சென்னை.

வலைப்பதிவுகள் (Web Sources)

1. Tamil Heritage Foundation- www.tamilheritage.org <http://www.tamilheritage.org>
2. Tamil virtual University Library- www.tamilvu.org/ library http://www.virtualvu.org/library
3. Project Madurai - www.projectmadurai.org.
4. Chennai Library- www.chennailibrary.com <http://www.chennailibrary.com>.
5. Tamil Universal Digital Library- www.ulib.prg <http://www.ulib.prg>.
6. Tamil E-Books Downloads- tamilebooksdownloads. blogspot.com
7. Tamil Books on line- books.tamil cube.com
8. Catalogue of the Tamil books in the Library of British Congress archive.org
9. Tamil novels on line - books.tamilcube.com

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF ENGLISH
UG PROGRAMME - B.A./ B.COM/B.B.A./ B.SC./BCA
SEMESTER- IV
GENERAL ENGLISH –IV (23UENL41)
(From 2023-2024 Batch onwards)

HOURS/WEEK: 6 (L-5, T-1) **INT. MARKS: 25**
CREDITS : 3 **EXT. MARKS: 75**
DURATION : 90 hrs **MAX. MARKS: 100**

Course Objectives

- To help learners imbibe the rules of language unconsciously and tune to deduce language structure and usage.
- To use receptive skills through reading and listening to acquire good exposure to language and literature.
- To develop language skill for effective communication.
- To provide exposure to plays, autobiographies and expose them to value based ideas.
- To enhance the learner's language skills especially in the areas of grammar and pronunciation.

Course Outcomes (CO)

On successful completion of the course, the learners will be able to
CO1 [K1]: state ideas effectively and appropriately in real life situations.
CO2 [K2]: demonstrate speaking skills in appreciating literature.
CO3 [K3]: use grammar and pronunciation effectively and appropriately.
CO4 [K4]: examine the literary works to develop language skills.
CO5 [K6]: construct grammatically correct and meaning full sentences.

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K1]	2	1	-	1	-	-	-
CO2[K2]	2	1	-	1	-	-	-
CO3[K3]	2	2	1	2	1	1	1
CO4[K4]	2	2	1	2	1	1	1
CO5[K6]	2	3	1	2	-	1	1
Weightage of the course	10	09	03	08	02	03	03
Weighted percentage of Course contribution to Pos	**1.81**	**1.79**	**0.75**	**1.83**	**0.68**	**1.05**	**0.97**

Based on the level of contribution ('3'-High, '2'-Medium, '1'-Low '-' No Correlation)

UNIT I - LIFE WRITING **(18 hrs)**

Malala Yousafzai - I am Malala - Chapter 1
Nikola Tesla - My Inventions - Chapter 2

UNIT II - ONE ACT PLAYS **(18 hrs)**

Edward Albee - The Zoo Story
Anton Chekhov - The Proposal

UNIT III - INTERVIEWS **(18 hrs)**

Nelson Mandela's Interview with Larry King
Rakesh Sharma's Interview with Indira Gandhi from Space
Lionel Messi with Sid Lowe (Print)

UNIT IV - LANGUAGE COMPETENCY **(18 hrs)**

Refuting, Arguing & Debating, Making Suggestions & Responding to Suggestions, Asking for and Giving Advice or Help, Interviews (face to face, telephone and video conferencing)

UNIT V - ENGLISH FOR WORKPLACE **(18 hrs)**

Job Applications: Covering letters, CV and Resume
Creating a digital profile - Linkedin
Filling Forms (Online & Manual): creation of account, railway reservation, ATM, Credit/debit card
Body Language -Practical Skills for Interviews

TEXTBOOKS

1. Yousafzai, Malala, and Christina Lamb. *I Am Malala The Girl Who Stood Up for Education and Was Shot by the Taliban*. New York: Little Brown, 2013.
2. Tesla , Nikola. *My Inventions.* London: Ingram Short Title, 2011.

REFERENCES

Books

1. Taylor, Mary Borg, & Francis, *Writing Your Life: A Guide to Writing Autobiographies.* Routledge, 2021.
2. Bert, A. Norman. *One-act Plays for Acting Students: An Anthology of Short one-Act Plays for one, Two or Three actors*. Christian Publisher LLC, 1987.
3. Dolley, Colin. and Rex Welford.*The One-Act Play Companion: A Guide to plays, Play wrights and Performance*. Bloomsbury Publishing,2015.
4. Bernis, Jeanne Kelly. Editor. *How to Build a Professional Digital Profile*. Bernish, Bernish Communications Associates, LLC, 2012
5. Yardley, M Yardley - Matwiejczuk, *Role Play-Theory and Practice.* SAGE publications ltd, 1997.

Web Sources

1. https://www.youtube.com/watch?v=JaLQJt8orSw&t=469s(the link to the performance; refer scripts by Aaron Sheperd) http://BBC learn English.com
2. https://www.infoplease.com/dictionary/brewers/animals-cries
3. http://onestopenglish.com
4. http://hearn-english-today.com
5. http://talkenglish.com

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI

DEPARTMENT OF BOTANY

UG Programme – B.Sc. Botany

SEMESTER – IV

CORE COURSE - VII: PLANT DIVERSITY IV - GYMNOSPERMS, PALEOBOTANY AND EVOLUTION (23UBYC41)

(From 2023-2024 Batch onwards)

HOURS/WEEK: 4 **INT. MARKS: 25**
CREDITS : 4 **EXT. MARKS: 75**
DURATION : 60 hrs **MAX. MARKS: 100**

Course Objectives

- To enable the students to understand thallus organization,
- To enable the students to understand internal and the reproductive structures of Gymnosperms and the importance of evolution.
- To acquaint students with evidences of the past history of plant groups and significance of the fossilization
- To know the scope of pleobotany, types of fossils and geological time scale.
- To Understand the various fossil genera representing different fossil groups.

Course Outcomes (CO)

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

CO1[K1]: recognize morphological variations of Bryophytes and Pteridophytes

CO2[K2]:explain the anatomy and reproduction of Bryophytes and Pteridophytes

CO3[K3]: compare and contrast the variations in the internal cellular organization, gametophyte and sporophyte of Bryophytes and Pteridophytes

CO4[K4]: decipher the stages of plant evolution and their transition to land habitat

CO5[K5]: access the useful role of Bryophytes and Pteridophytes

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K1]	3	3	3	2	1	1	-
CO2[K2]	3	3	2	2	3	1	1
CO3[K3]	3	3	3	2	1	-	2
CO4[K4]	3	3	3	3	3	2	2
CO5[K5]	3	3	3	3	2	-	-
Weightage of the course	15	15	14	12	10	04	05
Weighted percentage of Course contribution to Pos	**2.71**	**2.98**	**3.51**	**2.74**	**3.39**	**1.39**	**1.61**

Based on the level of contribution ('3'-High, '2'-Medium, '1'-Low '-' No Correlation)

UNIT I **(12 hrs)**

GYMNOSPERMS: Classification of Gymnosperms (Sporne, 1954) (up to family). General characteristics, Economic importance of Gymnosperms with special reference to oil, resin, timber, etc.

UNIT II **(12 hrs)**

GYMNOSPERMS: Morphology, anatomy and reproduction of the taxa belonging to each of the following orders: Cycadales (*Cycas*), Coniferales (*Pinus*). Gnetales (*Gnetum*).

UNIT III **(12 hrs)**

PALEOBOTANY: Introduction to fossils and fossilization processes such as compression, casts, molds, petrification, impressions and coal balls. Geological time scale. Radiocarbon dating. Contribution of Birbal Sahni.

UNIT IV **(12 hrs)**

P**ALEOBOTANY:** Study of the following fossils: Rhynia, Lepidodendron, Lepidocarpon, Calamites and Williamsonia sewardiana.

UNIT V **(12 hrs)**

EVOLUTION: Evolution - origin of life, chemosynthetic theory - evidences (any five). Theories of evolution - Darwin, Lamark and De veries, modern synthetic theory. Variation - analysis and sources, adaptive radiation, Concept of species - Allopatric and sympatric.

TEXTBOOKS

1. Gupta, M.N. *The Gymnosperms (2nd Edition)*, Shiva Lal Agarwala & Co., Agra, 1972.
2. Vashista, P.C. *Gymnosperms,* S.Chand & Co. New Delhi, . 1976
3. Bhatnagar, S.P and Moitra, A. *Gymnosperms.* New Age International Publishers, New Delhi, India. 1996.
4. Anil Kumar, Gymnosperms. S. Chand & Company Pvt. Ltd. New Delhi. 2006.
5. Bhatnagar S.P and Alok Moitra. Gymnosperms. Publisher: New Age International Pvt Ltd Publishers. New Delhi, 2013.

REFERENCES

Books

1. Sporne, K.R. *The Morphology of Gymnosperme.* B.I. Publications, New Delhi, 1991.
2. Bhatnagar, S.P and Moitra, A. *Gymnosperms*, New Age Int. Pvt. Ltd., New Delhi, 1996.
3. Stewart, W.N and Rathwell, G.W. *Paleobotany and the Evolution of Plants.* Cambridge University Press, 1993.
4. Raup, D.M and Steven, M. Stanley. *Principles of paleontology*. San Francisco: W.H. Freeman, 2004.
5. Bhatnagar S.P and Alok Moitra. *Gymnosperms*. Publisher: New Age International Pvt Ltd Publishers. New Delhi, 2013.

Web Sources

1. https://books.google.co.in/books?hl=en&lr=&id=Pn7CAAAQBAJ&oi=fnd&pg=PA1&dq=Introduction+to+Gymnosperms&ots=sfYSzCL02&sig=ysX1KRvetV0bAza4Sq6RWau4XU8&redir_esc=y#v=onepage&q=Introduction%20to%20Gymnosperms&f=false
2. https://books.google.co.in/books/about/Botany_for_Degree_Gymnosperm_Multicolor.html?id=HTdFYFNxnWQC&redir_esc=y
3. https://books.google.co.in/books/about/Gymnosperms.html?id=4dvyNckni8wC
4. https://arboretum.harvard.edu/wp-content/uploads/2013-70-4-beyond-pine-cones-an-introduction-to-gymnosperms.pdf
5. https://www.palaeontologyonline.com/

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI

DEPARTMENT OF BOTANY

UG Programme – B.Sc. Botany

SEMESTER – IV

CORE COURSE - VIII: PRACTICAL: PLANT DIVERSITY IV - GYMNOSPERMS, PALEOBOTANY AND EVOLUTION (23UBYC4P)

(From 2023-2024 Batch onwards)

HOURS/WEEK: 3 **INT. MARKS: 25**
CREDITS : 3 **EXT. MARKS: 75**
DURATION : 45 hrs **MAX. MARKS:100**

Course Objectives

- To enable students observe and record the morphological features of selected species of Gymnosperms.
- To enable students observe and record the anatomical features of selected species of Gymnosperms.
- To develop the skill of preparation of micro slides of the gymnosperm samples.
- To enable students to gain insights into the basics of paleobotany and methods of fossilization.
- To understand the anatomy of the fossil plants through microscopy.

Course Outcomes (CO)

On successful completion of the course, the learners will able to

CO1[K2]: recognize the major groups of Non-vascular and Vascular cryptogams

CO2[K3]: describe the structure of Bryophytes and Pteridophytes forms prescribed in the syllabus

CO3[K4]: identify and illustrate the morphological and anatomical features of bryophytes and Pteridophytes

CO4[K5]: develop comprehensive skills in sectioning and micro preparation

CO5[K56]: interpret the significance of reproductive structures in Bryophytes and Pteridophytes

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K2]	3	3	2	3	2	-	-
CO2[K3]	3	3	3	2	3	1	1
CO3[K4]	2	2	3	3	1	-	2
CO4[K5]	3	3	3	3	3	2	-
CO5[K6]	3	3	3	2	3	-	-
Weightage of the course	14	14	14	13	13	03	03
Weighted percentage of Course contribution to Pos	**2.53**	**2.78**	**3.51**	**2.97**	**4.41**	**1.05**	**0.97**

Based on the level of contribution ('3'-High, '2'-Medium, '1'-Low '-' No Correlation)

EXPERIMENTS

1. Study of morphology, anatomy and structure of the vegetative and reproductive organs of *Cycas, Pinus* and *Gnetum.*
2. Identifying the micro slides relevant to the syllabus.
3. Field visit to study the habitat (Hill station).
4. Study the following fossil members: *Rhynia*, *Lepidodendron*, *Lepidocarpon, Calamites* and *Williamsonia sewardiana* through permanent slides.
5. Photograph of evolution scientists.

TEXTBOOKS

1. Sharma O.P and S, Dixit. *Gymnosperms*. Pragati Prakashan. 2002.
2. Gangulee, H.C and A.K. Kar. *College Botany*. Vth Edition. S. Chand. 2013.
3. Sharma, O.P. *Textbook of Pteridophyta*, TATA MacMillan India Ltd., New Delhi. 2012.
4. Chamberlain, C.J.. *Gymnosperms: Structure and Evolution*. Chicago Reprinted 1950). New York. 1934
5. Bhatnagar, S.P and Moitra, A.. *Gymnosperms*. New Age International Publishers, New Delhi, India. 1996

REFERENCES

Books

1. Smith, G.M. *Cryptogamic Botany Vol .II*. Tata McGraw Hill. NewDelhi. 1955.
2. James.W. Byng. *The Gymnosperms practical hand book. A practical guide to extant families and genera of the world.* Published by plant Gateway, Tol Bot Street, Herford, SG137BX, United Kingdom. 2015.
3. Sharma, O.P. *Textbook of Pteridophyta,* TATA MacMillan India Ltd., New Delhi. 2012.
4. Chamberlain, C.J. 1934. *Gymnosperms: Structure and Evolution.* Chicago Reprinted 1950). New York.
5. Kirkaldy, J.E. *The study of Fossils.* Hutchinson Educational, London. 1963.

Web Sources

1. https://www.google.co.in/books/edition/Gymnosperms/3YrT5E3Erm8C?hl=en&gbpv =1&dq=gymnosperms&printsec=frontcover
2. https://www.amazon.in/Paleobotany-Biology-Evolution-Fossil-Plants/dp/0123739721
3. https://books.google.co.in/books/about/Paleobotany.html?id=HzYUAQAAIAAJ
4. https://trove.nla.gov.au/work/11471742?q&versionId=46695996
5. http://www.freebookcentre.net/Biology/Evolutionary-Biology-Books.html.

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF CHEMISTRY
UG Programme – B.Sc Botany
SEMESTER- IV
ELECTIVE COURSE GENERIC / DISCIPLINE SPECIFIC – IV: CHEMISTY FOR BIOLOGICAL SCIENCES – II (23UBYA41)
(From 2023-2024 Batch onwards)

HOURS/WEEK: 4 **INT. MARKS: 25**
CREDITS : 3 **EXT. MARKS: 75**
DURATION : 60 hrs **MAX. MARKS: 100**

Course Objectives

- To know the basics of coordination chemistry and water technology
- To get knowledge on carbohydrates
- To ensure the basics and applications of electrochemistry
- To acquire knowledge in the basics and applications of amino acids
- To understand various photochemical reactions

Course Outcomes (CO)

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

CO1[K1]: describe the principles coordination chemistry, carbohydrates, catalysis, photochemistry and electrochemistry

CO2[K2]: explain the concepts in water technology, amino acids and elements in biosystem

CO3[K3]: apply the Werner's theory, color reaction of amino acids and photochemical laws

CO4[K4]: analyze structure of carbohydrate, biomolecules, water components and quantum yield

CO5[K5]: discuss the various cells, order of reactions and amino acids

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1 [K1]	3	2	1	-	-	1	-
CO2 [K2]	3	2	1	1	-	-	-
CO3 [K3]	3	2	1	1	1	1	1
CO4 [K4]	2	2	1	1	-	-	1
CO5 [K5]	2	2	1	1	1	1	-
Weightage of the course	13	10	05	04	02	03	02
Weighted percentage of Course contribution to POs	**2.35**	**1.99**	**1.25**	**0.91**	**0.68**	**1.05**	**0.65**

Based on the level of contribution ('3'-High, '2'-Medium, '1'-Low '-' No Correlation)

UNIT I – CO-ORDINATION CHEMISTRY AND WATER TECHNOLOGY (12 hrs)

Co-ordination Chemistry: Definition of Terms – IUPAC Nomenclature – Werner's Theory – EAN rule – Pauling's Theory – Postulates – Applications to [Ni(CO)4], [Ni(CN)4]2-,[Co(CN)6]3- – Chelation – Biological Role of Haemoglobin and Chlorophyll (elementary idea) – Applications in Qualitative and Quantitative Analysis. Water Technology: Hardness of Water, Determination of Hardness of Water using EDTA Method, Zeolite Method – Purification Techniques – BOD, COD.

UNIT II – CARBOHYDRATES (12 hrs)

Classification, Preparation and Properties of Glucose and Fructose. Discussion of Open Chain Ring Structures of Glucose and Fructose. Glucose – Fructose Interconversion. Preparation and Properties of Starch and Cellulose.

UNIT III – AMINO ACIDS AND ESSENTIAL ELEMENTS OF BIOSYSTEM (12 hrs)

Classification – Preparation and Properties of Alanine, Preparation of Dipeptides using Bergmann Method – Proteins – Classification – Structure – Colour Reactions – Biological functions – Nucleosides – Nucleotides – RNA and DNA – Structure. Essentials of Trace Metals in Biological System-Na, Cu, K, Zn, Fe, Mg.

UNIT IV – ELECTROCHEMISTRY (12 hrs)

Galvanic Cells – Standard Hydrogen Electrode – Calomel Electrode – Standard Electrode Potentials – Electrochemical Series. Strong and Weak Electrolytes – Ionic Product of Water – pH, pKa, pKb. Conductometric titrations – pH Determination by Colorimetric Method – Buffer Solutions and its Biological Applications – Electroplating – Nickel and Chrome Plating – Types of Cells – Fuel Cells – Corrosion and its Prevention.

UNIT V – PHOTOCHEMISTRY (12 hrs)

Grothus – Draper's Law and Stark-Einstein's Law of Photochemical equivalence, Quantum yield – Hydrogen chloride reaction. Phosphorescence, Fluorescence, Chemiluminescence and Photosensitization and Photosynthesis (Definition with Examples).

TEXTBOOKS

1. Veeraiyan V, *Textbook of Ancillary Chemistry*, 1st Edition, High Mount Publishing House: Chennai, 2009
2. Vaithiyanathan S, *Textbook of Ancillary Chemistry*, Priya Publications: Karur, 2006.
3. Bahl B. S, Arul Bhal, *Advanced Organic Chemistry*, 23rd Edition, S. Chand and company: New Delhi, 2012.
4. Soni P. L and Chawla H M. *Textbook of Organic Chemistry*, 29th Edition, New Delhi: Sultan Chand & Sons, 2007.

REFERENCES

Books

1. Soni P. L and Mohan Katyal, Textbook of Inorganic Chemistry, 20th Edition, Sultan Chand & amp; Sons, 2007.

2. Puri B. R, Sharma L. R, Pathania M. S, *Textbook of Physical Chemistry,* 44th Edition, Vishal Publishing Co: New Delhi, 2018.
3. Sharma B. K. *Industrial Chemistry*. 16th Edition, Goel Publishing House: Meerut, 2014.

Web Sources

1. https://www.youtube.com/watch?v=m5cDbtdokqY
2. https://www.youtube.com/watch?v=j7PYqR1iGMg&list=PLF_7kfnwLFCF_VxKKAhHSLryCsJr3GW71
3. https://www.youtube.com/watch?v=zDok_HKM-aA&list=PLYXnZUqtB3K__uubnuRpEzgoLdZP3LhpY

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF CHEMISTRY
UG Programme –B.Sc Botany
SEMESTER IV
ELECTIVE COURSE GENERIC / DISCIPLINE SPECIFIC – IV: PRACTICAL: CHEMISTY PRACTICAL FOR BIOLOGICAL SCIENCES – II (23UBYA4P)
(From 2023-2024 Batch onwards)

HOURS/WEEK: 2 **INT. MARKS: 25**
CREDITS : 2 **EXT. MARKS: 75**
DURATION : 30 hrs **MAX. MARKS: 100**

Course Objectives

- To know the safety in chemistry lab
- To get an idea to handle the glassware
- To gain knowledge in the identification of organic functional groups
- To acquire knowledge for elemental determination
- To understand and differentiate organic compounds with functional groups

Course Outcomes (CO)

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

CO1[K2]: recognize the analytical procedure to identify the given organic compounds
CO2[K3]: determine the saturation/unsaturation nature of given organic compounds
CO3[K4]: inspect the aliphatic/aromatic and nature of given organic compounds
CO4[K5]: predict elements (other than C, H and O) present in the given compound
CO5[K6]: perform systematic analysis and report the functional groups present in the given organic compound. 130

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K2]	3	3	1	1	-	1	1
CO2[K3]	3	2	1	2	-	1	1
CO3[K4]	3	3	2	2	-	1	1
CO4[K5]	2	3	3	1	-	2	2
CO5[K6]	2	2	3	1	-	2	2
Weightage of the course	13	13	10	07	-	07	07
Weighted percentage of Course contribution to POs	**2.35**	**2.58**	**2.51**	**1.6**	**0**	**2.44**	**2.26**

Based on the level of contribution ('3'-High, '2'-Medium, '1'-Low '-' No Correlation)

SYSTEMATIC ANALYSIS OF ORGANIC COMPOUNDS

i. The Analysis must be carried out as Follows:

ii. Functional Group Tests [Phenol, Acids (Mono & Di) Aromatic Primary Amine, Amide (Mono & Di), Aldehyde and Glucose].

iii. Detection of Elements (N, S, Halogens).

iv. To Distinguish between Aliphatic and Aromatic Compounds.

v. To Distinguish – Saturated and Unsaturated Compounds

TEXTBOOK

1. Venkateswaran V, Veerasamy R, Kulandaivalu A. R, *Basic Principles of Practical Chemistry*, 2nd Edition, Sultan Chand & Sons, 1997.

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI

DEPARTMENT OF BOTANY

UG Programme – B.Sc. Botany

SEMESTER – IV

SKILL ENHANCEMENT COURSE - VII: INDUSTRY MODULE:

CULTIVATION OF ALGAE (23UBYS41)

(From 2023-2024 Batch onwards)

HOURS/WEEK: 2 **INT. MARKS: 25**
CREDITS : 2 **EXT. MARKS: 75**
DURATION : 30 HRS **MAX. MARKS: 100**

Course Objectives

- To impart sufficient information about the culture and cultivation of algae under laboratory and outdoor conditions.
- To study the media composition for algae cultivation and high value products and its applications.
- To know about the important seaweeds and its cultivation practices.
- To study the SLF production and applications in agriculture crops.
- To understand about the Environment Impact Assessment of algal cultivation.

Course Outcome (CO)

On successful completion of the course, the learners should be able to

CO1[K1]: obtain an in- depth knowledge on culture and mass cultivation of algae and its different methods

CO2[K2]: exploration and recommendation of the commercial potential of algal products

CO3[K3]: understand the applied facet of algology and acquire a complete knowledge about the cultivation methods in algae

CO4[K4]: describe the preparation of seaweed liquid fertilizers and their applications in agriculture and horticulture

CO5[K5]: acquiring the information about algal applications in different industries and agriculture fields in the current scenario

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K1]	3	2	1	3	2	1	2
CO2[K2]	3	2	1	2	1	-	1
CO3[K3]	2	1	1	3	2	1	-
CO4[K4]	3	3	3	3	1	2	1
CO5[K5]	2	3	2	2	1	-	-
Weightage of the course	13	11	08	13	07	04	04
Weighted percentage of Course contribution to Pos	**2.35**	**2.19**	**2.01**	**2.97**	**2.37**	**1.39**	**1.29**

Based on the level of contribution ('3'-High, '2'-Medium, '1'-Low '-' No Correlation)

UNIT 1 **(6 hrs)**

Morphology, life history and mass culture of microalgae: *Spirulina*, *Chlorella*, *Dunaliella* and *Botryococcus.*

UNIT II **(6 hrs)**

High value products: Single Cell Protein (SCP), phycocyanin, β-carotene, astaxanthin –biofuel, media composition – scale up – lab to land – race way ponds and photo bioreactor.

UNIT III **(6 hrs)**

Marine macroalgae: Morphology, life history and mass cultivation of *Gracilaria*, *Kappaphycus*, *Sargassum* and *Ulva.*

UNIT IV **(6 hrs)**

Polysaccharides :agar, carrageen, alginate – economic importance – seaweed as food, feed and Seaweed Liquid Fertilizer (SLF).

UNIT V **(6 hrs)**

Role of seaweeds in aquaculture: Environment Impact Assessment of algal cultivation.

TEXTBOOKS

1. Kumar H.D. and Singh, H.N. *A Text Book of Algae*, Affiliated EastWest Press Pvt. Ltd., New Delhi, Madras. 1976.
2. Kumar,H.D.. Introductory Phycology, Affiliated EastWest Press (P)Ltd. ,NewDelhi, Madras, Hyderabad, Bangalore. 1990.
3. Pandey, B.P. .*A Text book of Botany-Algae*, S. Chand & Co. ,(P) Ltd., NewDelhi. 1993.
4. Sharma,O.P. *Text Book of Algae,* Tata McGraw Hill Publishing Co., Ltd., NewDelhi,1990.
5. Vashista,B.R.. *Botany for degree students - Algae.* S.Chand & Co.,(P)Ltd., NewDelhi,1988.

REFERENCES

Books

1. Bilgrami,K.S.,andL.C.Saha. *A Text Book of Algae*, CBS Publishers & Distributors (P)Ltd., New Delhi. 1996.
2. Chapman,V.J. and Chapman, D.J., *The Algae*. 2nd Ed. ELBS& MacMillan, 498 pp., 1973.
3. FritschF.E , *The Structure and Reproduction of Algae,* Cambridge University Press, Cambridge, U.K. Vol.I-791 pp., Vol. II-939 pp., 1945.
4. Round,F.E.. *Biology of the Algae.* 2nd Ed.Edward Arnold, London. 278pp.,
5. Sharma, O.P.1990.*Text Book of Algae.*Tata McGraw Hill Publishing Co.,Ltd., New Delhi, 396, 1973.

Web Sources

1. https://www.aiche.org/academy/videos/conference-

presentations/study-culture-strategies-microalgae-continuous-photobioreactor-system-biofuel-production
2. https://link.springer.com/article/10.1007/s10811-013-9983-9
3. https://www.nrel.gov/docs/legosti/old/2360.pdf
4. file:///C:/Users/Lenovo/AppData/Local/Temp/alba2018.pdf file:///C:/Users/Lenovo/AppData/Local/Temp/Seaweed_aquaculture_Cultivation_technologies_ch all.pdf

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI

DEPARTMENT OF BOTANY

UG Programme – B.Sc. Botany

SEMESTER – IV

SKILL ENHANCEMENT COURSE -VIII: ENVIRONMENTAL IMPACT ANALYSIS (23UBYS42)

(From 2023-2024 Batch onwards)

HOURS/WEEK: 2 **INT. MARKS: 25**
CREDITS : 2 **EXT. MARKS: 75**
DURATION : 30 hrs **MAX. MARKS:100**

Course Objectives

- To understand about the theory and practice of environmental impact assessment.
- To develop skills in identifying and solving problems of environmental concerns.
- To define and classify Environmental Impacts and the terminology.
- To understands the environmental Impact assessment procedure.
- To list and describe environmental audits.

Course Outcome (CO)

On successful completion of the course, the learners should be able to

CO1[K1]: enumerate the fundamental concepts and significance of environmental impact assessment.

CO2[K2]: explain the important steps of EIA process.

CO3[K3]: interpret the environmental appraisal and procedures in India.

CO4[K4]: decipher how to prepare the various documents required by state and federal regulations.

CO5[K5]: develop their own perspectives on impact assessment and be able to solve problems related to environment.

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K1]	3	2	1	3	2	-	-
CO2[K2]	3	3	2	2	3	1	-
CO3[K3]	2	2	1	3	1	-	1
CO4[K4]	3	3	3	3	2	-	2
CO5[K5]	3	2	2	3	1	1	-
Weightage of the course	14	12	09	14	09	02	03
Weighted percentage of Course contribution to Pos	**2.17**	**2.39**	**2.26**	**3.2**	**3.05**	**0.7**	**0.97**

Based on the level of contribution ('3'-High, '2'-Medium, '1'-Low '-' No Correlation)

UNIT I **(6 Hrs)**

Origin and Development Purpose and aim, core values and principles, Environmental Management Plan, , Scope of EIA in Project planning and Implementation.

UNIT II **(6 hrs)**

EIA Process Components of EIA, EIA Methodology- Screening, Scoping, Baseline data, Impact Identification, Prediction, Evaluation and Mitigation, Appendices and Forms of Application.

UNIT III **(6 hrs)**

Techniques of Assessment-Cost - benefit Analysis, Matrices, Checklist, Overlays, Impact on Environmental component: air, noise, water, land, biological, social and environmental factors. EIA Document.

UNIT IV **(6 hrs)**

Main participants in EIA Process Role of Project proponent, environmental consultant, PCBs, PCCs, public and IAA. Public participation.

UNIT V **(6 hrs)**

Environmental Appraisal and Procedures in India and EIA Methodology, indicators and mitigation, Environmental Audit of different environmental resources, Risk Analysis, Strategic environmental assessment, ecological impact assessment: legislation.

TEXTBOOKS

1. Morris, P. and Therivel, R,. *Methods of Environmental Impact* Assessment, UCL Press, London. 1995.
2. Petts, J. *Handbook of Environmental Impact Assessment,* volume 1 and 2, Blackwell Science, Oxford. 1999.
3. Therivel, R. and Partidario, M.R. *The Practice of Strategic Environmental Assessment*, Earthscan, London. 1996.
4. Vanclay, F. and Bronstein, D.A. *Environmental and Social Impact Assessment*, Wiley & Sons, Chichester. 1995.
5. Rau, J.G. and Wooten, D.C., *Environmental Impact Assessment,* McGraw Hill Pub. Co., New York, 1996.

REFERENCES

Books

1. Kulkarni, V. and Ramachandra, T.V. *Environmental Management,* Capital Pub. Co. New Delhi. 2006.
2. Petts, J. *Handbook of Environmental Impact Assessment*- Volume 1 and 2. Blackwell Publishers, UK. 2005.
3. Glasson, J. Therivel, R. and Chadwick. *A. Introduction to Environmental Impact Assessment*. Routledge, London. 2006.
4. Canter, W.L. *Environmental Impact Assessment*, McGraw-Hill Science/ Engineering/ Math, New York. 1995.
5. Jain, R.K., Urban, L.V., Stracy, G.S., *Environmental Impact Analysis,* Van

Nostrand Reinhold Co., New York, 1991.

Web Sources

1. https://www.amazon.in/Environmental-Impact-Assessment-Gajbhiye-Khandeshwar-ebook/dp/B06XTNQ5PW
2. https://www.ikbooks.com/books/book/earth-environmental-sciences/environmental-impact-assessment/9789382332930/
3. https://www.elsevier.com/books/environmental-impact-assessment/mareddy/978-0-12-811139-0
4. https://link.springer.com/book/10.1007/978-3-030-80942-3
5. https://onlinelibrary.wiley.com/doi/book/10.1002/0471722022

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
UG PROGRAMME
SEMESTER- III & IV
ENVIRONMENTAL STUDIES (23UESR41)
(From 2023 - 2024 Batch onwards)

HOURS/WEEK: 2 (III SEM-1, IV SEM-1) **INT. MARKS: 25**
CREDITS : 2 **EXT. MARKS: 75**
DURATION : 30 hrs **MAX. MARKS: 100**

Course Objectives

- To provide a comprehensive understanding of various environmental issues, including pollution, deforestation, climate change, loss of biodiversity, water scarcity, and resource depletion
- To encourage sustainable practices in various sectors, such as energy, transportation, agriculture, and waste management.
- To promote the conservation and preservation of natural resources, habitats, and ecosystems
- To foster a sense of environmental ethics and values.
- To encourage individuals to, participate in community initiatives, and contribute to sustainable development at local, national, and global levels

Course Outcomes (CO)

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

CO1[K1]: recognize the importance of environment and role of Individuals in its protection.

CO2 [K2]: explain the key concepts of Ecosystem, biodiversity and climatic change

CO3[K3]: apply the right measures for the sustainable use of natural resources.

CO4[K4]: analyse the ethical, cross-cultural, and historical context of environmental issues and the links between Human and Natural Systems.

CO5[K5]: evaluate the impact of human action on the biological environment

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K1]	2	1	-	2	2	1	1
CO2[K2]	2	1	-	2	1	1	1
CO3[K3]	2	1	-	1	1	1	1
CO4[K4]	1	1	1	1	2	1	1
CO5[K5]	1	1	-	1	2	1	1
Weightage of the course	08	5	1	7	08	05	05
Weighted percentage of Course contribution to Pos	**1.45**	**0.99**	**0.25**	**1.6**	**2.71**	**1.74**	**1.61**

Based on the level of contribution ('3'-High, '2'-Medium, '1'-Low '-' No Correlation)

UNIT I – NATURAL RESOURCES (6 hrs)

Natural resources: Definition of resource; Classification of natural resources- biotic and abiotic, renewable and non-renewable. **Biotic resources:** Major type of biotic resources- forests, grasslands, wetlands, wildlife and aquatic (fresh water and marine); Microbes as a resource; Status and challenges. **Water resources:** Types of water resources- fresh water and marine resources; Availability and use of water resources; Environmental impact of over-exploitation, issues and challenges; Water scarcity and stress; Conflicts over water.

UNIT II –SUSTAINABLE DEVELOPMENT (6 hrs)

Soil as a resource and its degradation. **Energy resources:** Sources of energy and their classification, renewable and non-renewable sources of energy; Conventional energy sources- coal, oil, natural gas, nuclear energy; Non-conventional energy sources- solar, wind, tidal, hydro, wave, ocean thermal, geothermal, biomass, hydrogen and fuel cells; Implications of energy use on the environment. **Introduction to sustainable development:** Sustainable Development Goals (SDGs) - targets and indicators, challenges and strategies for SDGs.

UNIT III – ENVIRONMENTAL ISSUES LOCAL, REGIONAL AND GLOBAL (6 hrs)

Industrial revolution and its impact on the environment; Population growth and natural resource exploitation; Global environmental change. **Pollution:** Impact of sectoral processes on Environment, Types of Pollution- air, noise, water, soil, municipal solid waste, hazardous waste; Trans boundary air pollution; Acid rain; Smog. Land use and Land cover change: land degradation, deforestation, desertification, urbanization. **Biodiversity loss:** past and current trends, impact. Global change: Ozone layer depletion; Climate change.

UNIT IV – CONSERVATION OF BIODIVERSITY AND ECOSYSTEM (6 hrs)

Biodiversity and its distribution: Biodiversity as a natural resource; Levels and types of biodiversity; Biodiversity in India and the world; Biodiversity hotspots; Species and ecosystem threat categories. **Ecosystems and ecosystem services:** Major ecosystem types in India and their basic characteristics- forests, wetlands, grasslands, agriculture, coastal and marine; Threats to biodiversity and ecosystems. Major conservation policies: in-situ and ex-situ conservation approaches; Major protected areas.

UNIT V – CLIMATE CHANGE: IMPACTS, ADAPTATION AND MITIGATION (6 hrs)

Climate change: Natural variations in climate; Structure of atmosphere; Anthropogenic climate change from greenhouse gas emissions– past, present and future; Projections of global climate change with special reference to

temperature, rainfall, climate variability and extreme events; Importance of 1.5 °C and 2.0 °C limits to global warming; Impacts of climate change on ocean and land systems; Sea level rise, changes in marine and coastal ecosystems; Impacts on forests and natural ecosystems; **Mitigation of climate change -** Renewable energy sources; Carbon capture and storage, National climate action plan and Intended Nationally Determined Contributions (INDCs)

TEXTBOOKS

1. Chiras D. D and Reganold J. P, *Natural Resource Conservation: Management for a Sustainable Future,* 10th Edition, Pearson, 2010
2. Harris, Frances, *Global Environmental Issues,* 2nd Edition, Wiley-Blackwell

REFERENCES

Books

1. Krishnamurthy K. V, *Textbook of Biodiversity,* Science Publishers, Plymouth, UK.
2. Pittock, Barrie, *Climate Change: The Science, Impacts and Solutions,* 2nd Edition, Routledge.

Web Sources

1. https://www.youtube.com/watch?v=QewEi2U1jLs
2. https://www.unep.org/news-and-stories/story/marine-biodiversity-gets-lifeline-high-seas-treaty

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI

DEPARTMENT OF BOTANY

UG Programme - B.Sc. Botany

SEMESTER – V

CORE COURSE - IX: PLANT MORPHOLOGY, TAXONOMY AND ECONOMIC BOTANY (23UBYC51)

(From 2023- 2024 Batch onwards)

HOURS/WEEK : 4(L-3, T-1) **INT.MARKS: 25**

CREDITS : 3 **EXT. MARKS: 75**

DURATION : 60 hrs **MAX.MARKS:100**

Course Objectives

- To study the morphology of plant parts.
- To understand the internal structure of various plant parts.
- To acquire the basic knowledge of reproductive system of plants.
- To study the characters and economic importance of selected families.
- To study the extraction and processing of metabolites from plants.

Course outcomes (CO)

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

CO1[K1]: define the concepts in plant morphology and rules of IUCN in botanical nomenclature

CO2[K2]: classify systems of plant classification and recognize the importance of herbarium and virtual herbarium.

CO3[K3]: describe the core concepts of economic botany and relate its applications in human life.

CO4[K4]: analyze the characters of the families and the economic uses of plants.

CO5[K5]: interpret concepts related to phylogenetic systematics and APG system of classification.

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K1]	3	3	3	2	1	2	2
CO2[K2]	3	3	3	2	1	2	3
CO3[K3]	3	3	2	2	1	2	3
CO4[K4]	3	3	3	2	1	2	3
CO5[K5]	2	2	3	3	1	3	3
Weightage of the course	14	14	14	11	5	11	14
Weighted percentage of Course Contribution to POs	**2.53**	**2.78**	**3.51**	**2.51**	**1.69**	**3.83**	**4.52**

Based on the level of contribution ('3'-High, '2'-Medium, '1'-Low '-' No Correlation)

UNIT I **(12 hrs)**

Morphology – root system – modifications- shoot system – modifications- (Aerial, subaerial and underground), Leaf- Types- simple and compound – phyllotaxy, modifications (phyllode, pitcher), tendrils, stipules. Inflorescences- definition and types – racemose, eymose, mixed and special types. Fruits – classification.

UNIT II **(12 hrs)**

History of Angiopserm classification – Artificial, Natural and Phylogenetic system of classification. An outline of Benthem and Hooker system of classification, an overview of APG classification. Herbarium technique – collection, pressing, drying, mounting, and preservation of plant specimens, digital herbarium.Botanical survey of india.Botanical nomenclature –rules, typication and author citation.

UNIT III **(12 hrs)**

Study of the following families based on the natural system and their economic importance- Anonaceae, Nymphaeaceae, Capparidaceae-Rutaceae, Caesalpinaceae,Cucurbitaceae,Asteraceae, Apocyanaceae and Asclepiadaceae.

UNIT IV **(12 hrs)**

Study of the following families based on the natural system and their economic importance- Convolvulaceae, Acanthaceae, Lamiaceae, Amaranthaceae, Euphorbiaceae, Liliaceae, Orchidaceae and Poaceae.

UNIT V **(12 hrs)**

Source, Cultivation Method (brief) and the extraction/ processing of the economically important products of the following- Cereal (Rice), Pulses(Black gram),Sugar (Sugarcane), Beverage (Coffee), Oil seed (Ground nut), Spices (Cardamom), essential oil(Rose),Natural rubber and timber plants (teak) and Fibre (Cotton).

TEXTBOOKS

1. Takhtajan, A.L.. *Diversity and Classification of Flowering Plants*.; Columbia University Press, New York, 1997.
2. Woodland, D.W. *Contemporary Plant Systematics*. Prentice Hall. New Jersey. 1991.
3. Rajni Gupta. *Plant Taxonomy: Past, Present and Future.* Vedams (P) Ltd. New Delhi, 2012.

REFERENCES

Books

1. Harborne, J.B and Turner, B.L.. *Plant Chemosystematics,* Acad. Press, London, 1984.
2. Lawrence, G.H. *Taxonomy of Vascular Plants*.MacMillan Co., USA,1995.
3. Jones, S.B. Jr. and Luchsinger, A.E. *Plant Systematics (2nd edition),* McGraw-HilI Book Co., New York, 1986.

Web Sources

1. https://books.google.co.in/books/about/Plant_Taxonomy_2E.html?id=_pxWAwHiZIC&redirhttps://books.google.co.in/books/about/Plant_Taxonomy_and_Biosystematics.html?id=VfQnuwh3bw8C&redir_esc=y_esc=y
2. https://books.google.co.in/books/about/PLANT_TAXONOMY_2E.html?id=Roi0lwSXFnUC&redir_esc=y
3. https://books.google.co.in/books/about/Plant_Taxonomy.html?id=0bYs8F0Mb9gC&redir_esc=y
4. https://books.google.co.in/books/about/Economic_Botany.html?id=2ahsDQAAQBAJ&redir_esc=y
5. https://books.google.co.in/books/about/Textbook_Of_Economic_Botany.html?id=XmZFJO_JHv8C&redir_esc=y

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF BOTANY
UG Programme - B.Sc. Botany
SEMESTER – V
CORE COURSE - X: PLANT ANATOMY AND EMBRYOLOGY (23UBYC52)
(From 2023- 2024 Batch onwards)

HOURS/WEEK : 4(L-3,T-1) **INT.MARKS: 25**
CREDITS : 3 **EXT. MARKS: 75**
DURATION : 60 hrs **MAX.MARKS:100**

Course Objectives

- To know the basic system of cell and tissue system and their organisation in higher Plants.
- To differentiate dicot plants and their growth pattern from monocot plants.
- To understand the abnormal (anamalous) secondary growth in higher plants and wound healing and Abscission process.
- To study and differentiate ovules and its types.
- To know the importance of polyembryony and development pattern in higher plants.

Course outcomes (CO)

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

CO1[K1]: relate to the fundamental concepts of plant anatomy and embryology
CO2[K2]: describe the internal tissue organization of various plant organs
CO3[K3]: elucidate the stages of primary and secondary growth
CO4[K4]: compare the structural organization of flower in relation to the process of pollination and fertilization
CO5[K5]: discuss the various anatomical adaptations in plants

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K1]	3	3	3	3	1	2	3
CO2[K2]	3	3	3	2	2	2	3
CO3[K3]	3	2	3	3	1	2	2
CO4[K4]	3	3	3	3	1	2	3
CO5[K5]	3	3	2	3	1	2	3
Weightage of the course	15	14	15	14	6	10	14
Weighted percentage of Course Contribution to POs	**2.71**	**2.78**	**3.76**	**3.2**	**2.03**	**3.48**	**4.52**

Based on the level of contribution ('3'-High, '2'-Medium, '1'-Low '-' No Correlation)

UNIT I **(12 hrs)**

Cell wall – structure, and function. Tissues – Definition, types – Simple tissue system – parenchyma, ollenchymas and sclerenchyma (fibers and sclereids). Complex tissue system – xylem and phloem. Meristem: definition, structure, function and classification. Apical organization and theories: Apical cell theory, Histogen theory and Tunica-Corpus theory. Root apex: Histogen theory and Korper-Kappe theory.

UNIT II **(12 hrs)**

Primary structure of root and stem (Dicot and monocot). Epidermal tissue system: epidermis, cuticle, trichome, bulliform cells, periderm and silica cells. Ground tissue systems: cortex, endodermis, pericycle, pith and pith rays. Vascular tissue systems: different types of vascular bundles and their arrangement in oot and stem. Nodal anatomy: leaf trace, leaf gap, branch trace and branch gap-types.

UNIT III **(12 hrs)**

Secondary thickening in monocots and dicots, Secondary thickening in monocot and dicot root. Anomalous secondary growth of stem- *Boerhaavia, Nyctanthes* and *Dracaena*. Leaf - anatomy of dicot and monocot leaf. Periderm structure and development: Phellem, Phellogen, Phelloderm, Rhytidome and lenticels. Stomatal types.

UNIT IV **(12 hrs)**

Structure and development of anther - development of male gametophyte. Ovule: Structure of mature ovule**,** types of ovules; female gametophyte– megasporogenesis (monosporic, bisporic and tetrasporic) and megagametogenesis (*Polygonum* type); Organization and ultra structure of mature embryo sac.

UNIT V **(12 hrs)**

Double fertilization and triple fusion. Endosperm and its types - free nuclear, cellular, helobial, endosperm haustoria. Polyembryony - types, apomixis, parthenogenesis and parthenocarpy. Seed structure and its importance.

TEXTBOOKS

1. Bhojwani, S.S and Bhatnagar, S.P. *The Embryology of Angiosperms (4th revised and enlarged edition).* Vikas Publishing House, New Delhi, 2000.
2. Vimla Singh and Alok Abhishek. *Plant Embryology and Experimental Biology.* Educational Publishers and Distributors. New Delhi, 2019.

3. Pandey, B.P. *Plant Anatomy* . S. Chand Publ. New Delhi, 2015.
4. Bhatnagar,S.P., Dantu, P.K, Bhojwani, S.S. *The Embryology of Angiosperms 6th edition*. Vikas Publishing House. Delhi, 2014.

REFERENCES

Books

1. Dickison, W.C. *Integrative Plant Anatomy*. Harcourt Academic Press, USA, 2000.
2. Fahn, A. *Plant Anatomy*. Pergmon Press, USA, 1974.
3. Mauseth, J.D. *Plant Anatomy* .The Benjammin/Cummings Publisher, USA, 1988.
4. Evert, R.F*. Plant Anatomy: Meristems, Cells, and Tissues of the Plant Body: Their Structure, Function and Development*. John Wiley and Sons, Inc. Any local/state/regional flora published by BSI or any other agency, 2006.

Web Sources

1. https://www.amazon.in/PLANT-ANATOMY-EMBRYOLOGY-BIOTECHNOLOGY-ebook/dp/B07H5JYFBJ/ref=asc_df_B07H5JYFBJ/?tag=googleshopdes-2
2. https://www.kobo.com/us/en/ebook/a-textbook-of-plant-anatomy
3. https://archive.org/EXPERIMENTS/plantanatomy031773mbp
4. https://www.amazon.in/Embryology-Angiosperms-6th-S-P-Bhatnagar-ebook/dp/B00UN5KPQG
5. https://www.worldcat.org/title/embryology-of-angiosperms/oclc/742342811
6. https://books.google.co.in/books/about/Embryology_of_angiosperms.html?id=uYfwAAAAMAAJ&redir_esc=y.

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI

DEPARTMENT OF BOTANY

UG Programme - B.Sc. Botany

SEMESTER – V

CORE COURSE - XI: CELL BIOLOGY, GENETICS AND PLANT BREEDING

(23UBYC53)

(From 2023-2024 Batch onwards)

HOURS/WEEK : 4 (L-3,T-1) **INT.MARKS: 25**

CREDITS : 3 **EXT.MARKS: 75**

DURATION : 60 hrs **MAX.MARKS:100**

Course Objectives

- To know role of genes in character determination of an organism.
- To know the change in gene order, how it brings the change in external morphology and the characters in an organism.
- To know the production of hybrids.
- To know the structure and functions of cell and its organelles.
- To know the techniques in Hybridisation which brings the new varieties.

Course outcomes (CO)

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

CO1[K1]: enumerate the structure and functions of cells and organelles

CO2[K2]: explain about cell cycle, cell division and laws of inheritance with suitable examples

CO3[K3]: elucidate concepts of sex determination, sex linked inheritance and plant breeding

CO4[K4]: analyze the importance of genes interaction at population and evolutionary levels

CO5[K5]: develop conceptual understanding of plant genetic resources, plant breeding, gene bank and gene pool

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K1]	3	3	3	3	2	3	3
CO2[K2]	3	3	3	2	1	3	2
CO3[K3]	3	3	3	3	1	3	2
CO4[K4]	3	3	3	3	1	3	3
CO5[K5]	3	3	3	3	2	3	3
Weightage of the Course	15	15	15	14	7	15	13
Weighted percentage of Course Contribution to POs	**2.71**	**2.98**	**3.76**	**3.2**	**2.37**	**5.23**	**4.19**

Based on the level of contribution ('3'-High, '2'-Medium, '1'-Low '-' No Correlation)

UNIT I **(12 hrs)**

Introduction- scope- cell organisation- Ultra structure of Prokaryotic cell and Eukaryotic cell. Plant cell structure and function. Cell boundaries- cell wall- gross layer i.e. middle lamella, primary wall, secondary wall- Structure, chemistry and functions of cell wall, pits- (simple and bordered), Plasmodesmata. Plasma membrane- occurrence, structure (fluid mosaic model) chemistry, function and origin. Properties of Cytoplasm Membrane transport – Passive, active and facilitated transport, endocytosis and exocytosis.

UNIT II **(12 hrs)**

Occurrence, structure, function and origin of Endoplasmic reticulum, Golgi apparatus, Lysosomes, Ribosomes, Mitochondria, Chloroplast and Micro bodies. Semi genetic autonomy of Mitochondria and Chloroplast. Ultrastructure and functions of Nucleus, nuclear envelope, nuclear pore complex, nucleolus, chromosomes structure molecular organization of chromatin, Euchromatin, heterochromatin, Polytene and Lampbrush chromosomes-, Centromere: types. cell inclusion. Cell cycle, Cell division, Mitosis and Meiosis- their significance.

UNIT III **(12 hrs)**

Mendelian genetics – monohybrid, dihybrid crosses. Laws of Mendel, Reciprocal cross - Back cross and Test cross. Incomplete dominance - *Mirabilis jalaba.* Interaction of factors – Complementary genes, Supplementary genes, inhibitory genes, epistasis (dominant and recessive), duplicate genes and multiple alleles.

Multiple alleles. ABO Blood grouping in Human. Chromosome theory of linkage, crossing over, recombinations and mapping of genes on chromosomes. Sex determination in plants.

UNIT IV **(12 hrs)**

Sex linked inheritance – Haemophilia and colour blindness. Polyploidy origin, types and significance. Mutation-types and significance. chromosomal aberration – addition, deletion, inversion, duplication and translocation.

Extra nuclear inheritance and its significance - Male sterility in corn, Maternal inheritance – Plastid Inheritance in *Mirabilis jalaba*. Genetics of *Neurospora*. Population genetics – Hardy – Weinberg principle.

UNIT V **(12 hrs)**

Principles involved in plant breeding. Plant introduction and acclimatization. Methods of crop improvement: selection (mass, pure line and clonal), hybridization techniques. Heterosis – Interspecific and intergeneric, causes and effects. Mutation in plant breeding, polyploidy in plant breeding and its applications. Breeding for crop improvement for paddy and sugarcane.

Biotechnology in crop improvement: Transgenics – scope and limitations; Bt-Cotton.

TEXTBOOKS

1. Verma, P.S and V.K. Agarwal. *Cytology*.. S. Chand & Co. Ltd., New Delhi-55, 2002.
2. Singh, R. J. *Plant Cytogenetics, 3rd Edition*. CRC Press, Boca Raton, Florida, USA, 2016.
3. Singh, R.J. *Practical Mannual on Plant Cytogenetics*. CRC Press, Boca Raton, Florida, USA, 2017.

REFERENCES

Books

1. Cooper, G.M and Hausman, R.E. *The Cell: A Molecular Approach. 5th edition*. ASM Press & Sunderland, Washington, D.C. Sinauer Associates, MA, 2009.
2. Becker, W.M., Kleinsmith, L.J., Hardin. J and Bertoni, G. P. *The World of the Cell. 7th edition.* Pearson Benjamin Cummings Publishing, San Francisco, 2009.
3. Klug, W.S., Cummings, M.R., Spencer, C.A. *Concepts of Genetics. 9th edition.*. Benjamin Cummings, U.S.A, 2009.

Web Sources

1. http://www.freebookcentre.net/Biology/Cell-Biology-Books.html
2. https://www.us.elsevierhealth.com/medicine/cell-biology
3. https://www.amazon.in/Cell-Biology-Thomas-D-Pollard-ebook/dp/B01M7YAL2A
4. http://www.freebookcentre.net/medical text books journals/genetics ebooks online texts download.html
5. https://www.us.elsevierhealth.com/medicine/genetics
6. https://libguides.uthsc.edu/genetics/ebooks
7. https://www.kobo.com/us/en/ebook/principles-of-plant-genetics-and-breeding
8. http://sharebooks.com/content/plant-breeding-ebooks-raoul-robinson

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF BOTANY
UG Programme - B.Sc. Botany
SEMESTER – V
CORE COURSE - XII: PRACTICAL - PLANT MORPHOLOGY, TAXONOMY AND ECONOMIC BOTANY (23UBYC5P)
(From 2023- 2024 Batch onwards)

HOURS/WEEK : 3 **INT.MARKS: 25**
CREDITS : 3 **EXT. MARKS: 75**
DURATION : 45 hrs **MAX.MARKS:100**

Course Objectives

- To develop skills to collect, preserve and identify the herbarium specimen.
- To identify the plants based on their morphological characters.
- To draw the floral parts and able to write the floral formula.

Course outcomes (CO)

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

CO1[K2]: explain plant morphological characters

CO2[K3]: identify locally available plants and their respective families

CO3[K4]:develop comprehensive skills in field identification, collection of specimens, writing technical description, botanical drawings and herbaria preparation

CO4[K5]: construct floral diagram and write floral formula for a given flower

CO5[K6]: validate the plant specimen by analyzing and dissecting the vegetative and floral characters

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K2]	3	3	3	2	-	2	3
CO2[K3]	3	3	3	2	1	2	3
CO3[K4]	3	3	3	2	-	2	3
CO4[K5]	3	3	2	1	1	2	2
CO5[K6]	3	2	3	1	1	2	2
Weightage of the course	15	14	14	8	3	10	13
Weighted percentage of Course Contribution to POs	**2.71**	**2.78**	**3.51**	**1.83**	**1.02**	**3.48**	**4.19**

Based on the level of contribution ('3'-High, '2'-Medium, '1'-Low '-' No Correlation)

EXPERIMENTS

1. Morphology of root, stem and leaf modification, types of inflorescence.
2. Plants of local flora included under theory syllabus and family identification and derivation based on reasoning.
3. Dissection, identification, observation and sketching the floral parts of the plants belonging to the families included in the syllabus.
4. Students must describe the floral parts, draw the L.S., floral diagram and write the floral formula of at least one flower from each family.
5. Twenty (20) Herbarium sheets, field notebook and bonafide record to be submitted.
6. Study the products of plants mentioned in the syllabus of economic botany with special reference to the morphology, botanical name and family.
7. Field trips to places for observation, study and collection of plants prescribed in the syllabus for 2 to 5 days under the guidance of faculties.

TEXTBOOKS

1. Gokhale, S.B., Kokate, C.K. and Gokhale, A. *Pharmacognosy of Traditional Drugs*., *1st Edition*., 2016.
2. Rendle, A.B. The *Classification of Flowering Plants (Vol. I & II).* Vikas Students Education,1980.
3. Nordenstam, B., EI Gazaly, G and Kassas, M. *Plant Systematics for 21st Century.* Portlant Press Ltd London, 2000.

REFFERENCES

Books

1. Mann J. Davidson, R.S and J.B. Hobbs, D.V. Banthorpe, J.B. Harborne. *Natural Products*. Longman Scientific and Technical Essex,1994.
2. 2. Gopalan, C., B.V. Ramasastri and S.C. Balasubramanian. *Nutritive Value of Indian Foods.* National Institute of Nutrition, Hyderabad, 1985.
3. Grant, W.E. *Plant Biosystematics*. Academic Press, London. 1984.

Web Sources

1. https://www.amazon.in/Practical-Taxonomy-Angiosperms-R-Sinha/dp/9380578210
2. https://www.wileyindia.com/plant-science/practical-taxonomy-of-angiosperms-2ed.html
3. https://www.flipkart.com/practical-taxonomy-angiosperms/p/itm194794e7a76e8
4. https://books.google.co.in/books/about/Plant_Taxonomy.html?id=uWg76rCqA68C
5. https://www.amazon.in/PLANT-TAXONOMY-Sharma/dp/0070141592
6. https://www.kopykitab.com/Economic-Botany-By-Manoj-Kumar-Sharma-eBook.

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF BOTANY
UG Programme - B.Sc. Botany
SEMESTER – V
CORE COURSE - XIII: PRACTICAL VI - PLANT ANATOMY, EMBRYOLOGY, CELL BIOLOGY, GENETICS AND PLANT BREEDING (23UBYC5Q)
(From 2023- 2024 Batch onwards)

HOURS/WEEK : 3 **INT.MARKS : 25**
CREDITS : 3 **EXT. MARKS : 75**
DURATION : 45 hrs **MAX.MARKS :100**

Course Objectives

- To study the anatomy of the plant organs using various techniques.
- To study the embryology of the plant.
- To identify the structure of the various cell organelles
- To understand the genetics through problem solving.
- To study various plant breeding techniques.

Course outcomes (CO)

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

CO1[K2]: identify the structure of cell organelles and stages of cell division.

CO2[K3]: classify the types of stomata and ovules.

CO3[K4]: compare the functions of various ergastic substances present in plant tissues.

CO4[K5]: perform free hand sectioning of plant materials and decipher the internal tissue organization.

CO5[K6]: interpret the given genetic data to develop genetic map based on the principles of Mendelian inheritance and gene interaction.

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K1]	3	3	3	3	2	3	3
CO2[K2]	3	3	3	3	2	2	2
CO3[K3]	3	3	3	3	1	2	3
CO4[K4]	3	3	2	3	2	3	3
CO5[K5]	2	3	3	3	2	3	3
Weightage of the Course	14	15	14	15	9	12	14
Weighted percentage of Course Contribution to POs	**2.53**	**2.98**	**3.51**	**3.42**	**3.05**	**4.18**	**4.52**

Based on the level of contribution ('3'-High, '2'-Medium, '1'-Low '-' No Correlation)

EXPERIMENTS

Anatomy

1. Study of simple and complex (Primary and Secondary) tissues by maceration.
2. Study the internal structure of primary (young) and secondary (old) stems. Internal structure of dicot and monocot stem. Internal structure of dicot and monocot root.
3. Anomalous secondary growth in the stems of *Boerhaavia, Nycthanthes* and *Dracaena*.
4. T.S of dicot and monocot leaves.
5. Study of stomatal types. Field trips to places for observation, study and collection of plants prescribed in the syllabus for 2 to 5 days under the guidance of faculties.

Embryology

1. T.S of (young and mature) anther (section from *Datura* or *Cassia* flower).
2. Observation of pollinia (slide only).
3. Types of ovules- Anatropous, Orthotropous, Circinotropous, Amphitropous, Campylotropous (Permanent slides).
4. Types of Endosperm - Nuclear, cellular and helobial.
5. Dissection and display of any two stages of embryo in *Tridax*

Cell biology

1. Study of the photomicrographs of cell organelles.
2. Ergastic substances - starch grains, aleurone grains, crystals – cystolith and raphide.
3. Study the polytene and lamp brush chromosome structure through photograph.
4. Identification of different stages of mitosis by using squash and smear techniques – Onion root tip.

Genetics

1. Genetic problems – test cross, back cross and allelic interaction.
2. Construction of chromosome map – three point test cross
3. Multiple alleles problems

Plant Breeding

1. Emasculation technique.
2. To test the viability of seeds using Tetrazolium chloride.
3. Genetic models of heterosis.
4. Phenotype of heterosis (Maize).

TEXTBOOKS

1. Sharma, H.P. *Plant Embryology: Classical and Experimental.* Bombay Popular Prakashan, 2009.
2. Gupta P.K. *Cell and Molecular Biology .* Rastogi Publications, Meerut, 2017.
3. Krebs J.E., Goldstein E.S and Kilpatrick S.T. *Lewin's GENES* . Jones & Bartlett Learni, 2017.

REFFERENCES

Books

1. Gardener, J, Simmons, H.J and Snustad, D.P. *Principle of Genetics*. John Wiley & Sons, New York, 2006.
2. Jackson, S.A., Kianian, S.F., Hossain, K.G., and Walling, J. G. *Practical laboratory exercises for plant molecular cytogenetics. In Plant Cytogenetics* . Springer, New York, NY, 2012.
3. Allen, Sarah et al. *Plant Anatomy Lab Manual* . Fall, 2016.
4. De Robertis E.D.P. and De Robertis E.M.P. *Cell and Molecular Biology (8thed.) (South Asian Edition)*. Lea and Febiger, Philadelphia, USA, 2017.

Web Sources

1. https://www.amazon.in/Practical-Anatomy-Adriance-1901-1973-Foster/dp/1341784509
2. https://books.google.co.in/books/about/Practical_Manual_Of_Plant_Anatomy_And_Em.html?id=Cq1KPwAACAAJ&redir_esc=y
3. https://www.amazon.in/Cell-Biology-Dr-Renu-Gupta/dp/8193651219
4. https://www.amazon.in/Practical-Handbook-Genetics-Vikas-Pali/dp/932727248X
5. https://www.amazon.in/Practical-Handbook-Plant-Breeding-Vikas/dp/9327272498.

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF BIOTECHNOLOGY
UG Programme - B.Sc. Botany
SEMESTER – V
CORE COURSE XIV: PROJECT WITH VIVA (23UBYJ51)
(From 2023-2024 Batch onwards)

HOURS/WEEK: 4 **INT.MARKS: 25**
CREDITS : 3 **EXT. MARKS: 75**
DURATION : 60 hrs **MAX.MARKS:100**

Course Objectives

- To apply their skills and knowledge acquired during the course.
- To design and develop the simple projects.
- To know about basic Research methodology.
- To interpret the results obtained.
- To find the solution for biological issues.

Course outcomes (CO)

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

CO1[K2]: demonstrate the acquired basic knowledge of technological tools andtechniques in specific domain
CO2[K3]: apply the domain specific subject knowledge in project
CO3[K4]: present the solution orally and in the form of project report
CO4[K5]: choose alternative solution for the existing problem definition
CO5[K6]: prepare formal report which describes the work undertaken using ICT tools

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K2]	3	3	3	1	1	1	1
CO2[K3]	3	3	3	1	1	2	1
CO3[K4]	3	3	3	2	1	1	1
CO4[K5]	3	3	3	3	1	1	1
CO5[K6]	3	3	3	3	1	1	1
Weightage of the course	15	15	15	10	05	06	05
Weighted percentage of Course contribution to POs	**2.71**	**2.98**	**3.76**	**2.28**	**1.69**	**2.09**	**1.61**

Based on the level of contribution ('3'-High, '2'-Medium, '1'-Low '-' No Correlation)

Guidelines for Project Submission (UG)

1. Students will work individually or in groups with maximum 2 members on asemester-long project.
2. Depending on the interest of the students, project research areas will be chosen.
3. The Students must meet the guide periodically.
4. The project carries 100 marks of which 25 marks for Internal Assessment and 75 marks for External Examination.
5. There will be two project review sessions.
6. A draft of the final project report should be submitted to the Project Guide forreview at least two weeks prior to the end of the semester.
7. The project report should be of minimum 40 pages (excluding bibliography &appendices)
8. Two copies of the final project report should be submitted.
9. The Head of the department and the Project Guide will evaluate the final ProjectReport.
10. The viva-voce board shall consist of the External Examiner, the Head of the Department and the Internal Examiner

The following rubrics will be taken into account for the evaluation of Project workand viva-voce:

Internal Assessment (25 Marks)		**External Examination (75 Marks)**	
Project work & Review	: 15 Marks	Project Report	: 25 Marks
Powerpoint Presentation	: 5 Marks	Viva	: 50 Marks
Demo/Performance	: 5 Marks		

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF BOTANY
UG Programme - B.Sc. Botany
SEMESTER – V
ELECTIVE COURSE GENERIC/DISCIPLINE SPECIFIC - V: BIO ANALYTICAL TECHNIQUES (23UBYO51)
(From 2023- 2024 Batch onwards)

HOURS/WEEK : 3(L-2,T-1) **INT.MARKS: 25**
CREDITS : 2 **EXT. MARKS: 75**
DURATION : 45 hrs **MAX.MARKS :100**

Course Objectives

- To understand the principle, operation and maintenance of various tools in the laboratory.
- To equip the students to collect, analyze and data generated by their own inquiries.
- To give an exposure to various forms of field of research and data analysis techniques.
- To provide the overview on modern equipments.

Course outcomes (CO)

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

CO1[K1]: relate to the various biological techniques and its importance
CO2[K2]: explain the principles of microscopic, chromatographic and electrophoretic techniques
CO3[K3]: apply suitable strategies in data collections and disseminating research findings
CO4[K4]:compare and contrast the significance of different bioanalytical techniques
CO5[K5]:develop methodologies for extraction and analysis of biochemical compounds

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K1]	3	2	2	3	2	2	2
CO2[K2]	3	3	2	2	1	3	1
CO3[K3]	2	2	3	2	1	2	1
CO4[K4]	3	2	1	1	3	2	3
CO5[K5]	2	2	1	3	2	2	2
Weightage of the	13	11	9	11	9	11	9

course							
Weighted percentage of Course Contribution to POs	**2.35**	**2.19**	**2.26**	**2.51**	**3.05**	**3.83**	**2.9**

Based on the level of contribution ('3'-High, '2'-Medium, '1'-Low '-' No Correlation)

UNIT I **(9 hrs)**

Microscopy:Principles of microscopy; Light microscopy; compound microscopy, bright field microscope, dark field microscope, phase-contrast microscope, Fluorescence microscopy; Transmission and Scanning electron microscopy. Microscopic measurements-micrometry, Microscopy drawing: Camera Lucida.

UNIT II **(9 hrs)**

Chromatographic Principles and Applications:Principle; Paper chromatography, Thin Layer Chromatography (TLC), Column chromatography, Gas chromatography – Mass spectrometry (GCMS), High Performance Liquid Chromatography (HPLC).

UNIT III **(9 hrs)**

Electrophoresis And Ph Meter Basic principle, construction and operation of pH meter. Polyacrylamide gel electrophoresis (PAGE), Agarose Gel Electrophoresis.

UNIT IV **(9 hrs)**

Principle and law of absorption, construction, operation and uses of colorimeter and UV–Visible spectrophotometer, Principles, methods of centrifugation, types of centrifuge and applications.

UNIT V **(9 hrs)**

Biostatistics-Data collection methods, population, samples, parameters; Representation of Data: Tabular, Graphical– Histogram – frequency curve – Bar diagram–measures of central tendency – Mean, Median and Mode; Standard deviation, Standard error, Chi-square test and goodness of fit –t–test.

TEXTBOOKS

1. Sharma, V.K.. *Techniques in microscopy and cell biology.* Tata McGraw Hill, New Delhi, 1991
2. Sawhney, S.K and Randhir Singh. *Introductory practical biochemistry*. Narosa Publishing House, 2000.
3. Asokan, P. *Basics of analytical biochemistry*. Chinna Publications, 2001.

4. Bajpai, P.K. *Biological instrumentation and methodology*. S. Chand & Company, New Delhi, 2006.
5. Veerakumari, L. *Bioinstrumentation*. MJP Publications, 2009.
6. 6.Palanivelu, P. *Analytical Biochemistry and Separation techniques*. 20th century publications, Palkalai nagar, Madurai, 2013.

REFERNCES

Books

1. Rana, S.V.S. *Biotechniques: Theory and Practice.* Rastogi Publications, 2009.
2. Sundar Rao, P.S.S and Richard, J. *Introduction to Biostatistics and research methods.* PHI learning Private Ltd., New Delhi, 2011.
3. Zar, J.H. *Biostatistical Analysis*. Pearson Publication. U.S.A, 2012.

Web Source

1. https://www.kobo.com/in/en/ebook/bioinstrumentation-1
2. https://www.worldcat.org/title/bioinstrumentation/oclc/74848857
3. https://www.amazon.in/Bioinstrumentation-M-H-Fulekar-Bhawana-Pandey-ebook/dp/B01JP3M9TW
4. https://www.amazon.in/Handbook-Biomedical-Instrumentation-R-S-Khandpur-ebook/dp/B0129ZDO9W?ref=kindlecontentin50-21&tag=kindlecontentin50-21&gclid=CjwKCAiAx_DwBRAfEiwA3vwZYkqkwRb_EGf73exaWpY8D9JNpJZsOcXQCQ4pZlRzTrYH2lopaVP1xxoClPgQAvD_BwE
5. https://www.kobo.com/us/en/ebooks/biostatistics
6. https://www.amazon.in/Biostatistics-Veer-Bala-Rastogi-ebook/dp/B07LDCPXDG

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI

DEPARTMENT OF BOTANY

UG Programme - B.Sc. Botany

SEMESTER – V

ELECTIVE COURSE GENERIC/DISCIPLINE SPECIFIC - V: AQUATIC BOTANY (23UBYO52)

(From 2023-2024 onwards)

HOURS/WEEK : 3(L-2,T-1) **INT.MARKS: 25**

CREDITS : 2 **EXT.MARKS: 75**

DURATION : 45 hrs **MAX.MARKS:100**

Course Objectives

- To give an overview of the distribution of lower plants forms and its ecological significance.
- To enable the students to understand the ecological functions and economic uses of aquatic plants.
- To enable the students to collect, analyze and identify the planktons.
- To give an exposure of various forms of seaweeds.
- To know the values and uses of aquatic plants.

Course outcomes (CO)

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

CO1[K1]: recognize aquatic plants and their ecological importance

CO2[K2]: explain about commonly occurring marine and limnetic algae of the Indian coasts

CO3[K3]: apply techniques for conservation of aquatic plants for value addition

CO4[K4]: analyze and decipher the significance and properties of mangroves, other aquatic angiosperms and microalgae

CO5[K5]: develop new strategies to conserve mangroves and device innovative methods for cultivation of aquatic plants

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K1]	3	2	2	3	2	2	2
CO2[K2]	3	3	2	2	1	3	1
CO3[K3]	2	2	3	2	1	2	1
CO4[K4]	3	2	1	1	3	2	3
CO5[K5]	2	2	1	3	2	2	2
Weightage of the course	13	11	9	11	9	11	9
Weighted percentage of Course Contribution to POs	**2.35**	**2.19**	**2.26**	**2.51**	**3.05**	**3.83**	**2.9**

Based on the level of contribution ('3'-High, '2'-Medium, '1'-Low '-' No Correlation)

UNIT I **(9 hrs)**

Marine And Limnetic Macro Algae-Common seaweeds of Indian subcontinent: *Ulva, Caulerpa, Sargassum, Gracilaria,* etc. Common terrestrial algae, including cyanobacteria and lichen photobionts of Indian subcontinent and its life cycle, ecology and taxonomy: *Anabaena, Chlorella*, *Scenedesmus.*

UNIT II **(9 hrs)**

Mangroves-Mangrove forests of India, including Sundarbans, Pichavaram, Kerala mangroves, Rathnagiri mangroves. Common species of mangroves and mangrove associated plants, including *Avicennia, Rhizophora, Acanthus* and *Aegiceras*. Ecological significance of mangroves.

UNIT III **(9 hrs)**

Phytoplanktons, Cyanobacteria, Dinoflagellates And Diatoms-Common marine microalgae of India, including phytoplanktons and picoplanktons, Common diatoms and dinoflagellates of Indian Ocean, Common limnetic and terrestrial cyanobacteria of India.

UNIT IV **(9 hrs)**

Aquatic Angiosperms**-**Common aquatic angiosperms of India, including Lotus, Water Lilly, Water hyacinth. Ecology, life cycle, taxonomy and economic importance of aquatic angiosperms.

UNIT V **(9 hrs)**

Values And Uses Of Aquatic Plants-Economic importance of aquatic plants, Ecosystem services of aquatic plants, including biogeochemical cycles, oxygen production and carbon sequestration and so on, edible seaweed and algal resources of Ind1Qia, aesthetic, cultural, spiritual importance of aquatic plants.

TEXTBOOKS

1. Lee, R.E. *Phycology. 4th edition*. Cambridge University Press, Cambridge, 2008.
2. Wile, J.M, Sherwood, L.M and Woolverton, C.J. *Prescott's Microbiology. 9th Edition*. Mc Graw Hill International, 2013.
3. Bast, F. *Seaweeds: Ancestors of land plants with rich diversity*. Resonance, 19(2) 1032-1043 *ISSN*: 0971-8044, 2014.

REFERNCES

Books

1. Kathiresan, K and S.Z. Qasim. *Biodiversity of Mangrove Ecosystems*. Hindustan Lever Limited, 2005.
2. Allan, J.D. and Castillo, M.M. *Stream Ecology (Second Ed.).* Springer, Netherlands. 2009.

Web Sources

1. http://kyry6.gq/73447c/aquatic-botany-published-by-elsevier-science.pdf
2. http://fuls7.gq/82442e/aquatic-botany-published-by-elsevier-science.pdf
3. https://www.springer.com/gp/book/9788132221777
4. http://dwit21.cf/7744a1/aquatic-botany-published-by-elsevier-science.pdf
5. https://www.amazon.in/Aquatic-Plants-iFlora-Plant-Guide-ebook/dp/B07NS9V7LN

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF BOTANY
UG Programme - B.Sc. Botany
SEMESTER – V
ELECTIVE COURSE GENERIC/DISCIPLINE SPECIFIC - V: ENTREPRENEURIAL BOTANY (23UBYO53)
(From 2023-2024 onwards)

HOURS/WEEK: 3(L-2,T-1) **INT.MARKS: 25**
CREDITS : 2 **EXT. MARKS: 75**
DURATION : 45 hrs **MAX.MARKS:100**

Course Objectives

- To enable students to develop innovative ideas to exploit the economically useful plant products for commercial purposes.
- To inculcate entrepreneurial values to start a new business .
- To comprehend the molecular process.
- To expose the students a fundamental of the various value added products.
- To introduce the entrepreneurial opportunities.

Course outcomes (CO)

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

CO1[K1]: recognize the significance of government agencies for entrepreneurship development

CO2[K2]: explain about entrepreneurial values, risk assessment and solutions.

CO3[K3]: make use of entrepreneurial opportunities.

CO4[K4]: analyze and decipher the significance of bio-venture and value added products.

CO5[K5]: devise innovative methods for making value added products.

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K1]	3	2	2	3	2	2	2
CO2[K2	3	3	2	2	1	3	1
CO3[K3]	2	2	3	2	1	2	1
CO4[K4]	3	2	1	1	3	2	3
CO5[K5]	2	2	1	3	2	2	2
Weightage of the course	13	11	9	11	9	11	9
Weighted percentage ofCourse contribution to POs	**2.35**	**2.19**	**2.26**	**2.51**	**3.05**	**3.83**	**2.9**

Based on the level of contribution ('3'-High, '2'-Medium, '1'-Low '-' No Correlation)

UNIT I **(9 hrs)**

Introduction-Need - definition and concept - Types and characterization - entrepreneurial values- motivation and barriers-entrepreneurship as innovation, risk assessment and solutions.

UNIT II **(9 hrs)**

Bioventure-Industry - overview of *Spirulina*, *Pleurotus*, Natural dyes, Banana fibers, Wine, Hydroponics, Drumstick and coconut - Straight Vegetable Oil (SVO) and Pure Plant Oil (PPO) -methods and marketing - fresh and dry flowers for aesthetics.

UNIT III **(9 hrs)**

Value added Products-Canning of fruits - process and equipment, fruit and vegetable based products (squash) - ready to serve (RTS) (syrup, pulp, paste, ketchup, soup, vegetable sauces, jam and jellies), Palmyrah Palm products, Perfumes from Rose/Jasmine - Bamboo and cane based products-virgin coconut oil, jasmine oil production, nutraceuticals, standards and quality management.

UNIT IV **(9 hrs)**

Organizations and Agencies- TIIC, DIC, NABARD, MICROSTAT, DBT - case study - sarvodaya – SIDCO – Micro Small and Medium Enterprises – support structure for promoting entrepreneurshoip – various government schemes.

UNIT V **(9 hrs)**

Entrepreneurial Opportunities-Understanding a market and assessment, selection of an enterprise, business planning, mobilization of resources, Break Even Analysis, project proposal (guidelines, collection of information and preparation of project report), steps in filing patents, trademarks and copyright, Intellectual Property Rights, export and import license

TEXTBOOKS

1. Taneja,S.and Gupta,S.L. *Entrepreneurship development*. New venture creation, Galgeha publication company, New Delhi, 2015.
2. Desai,V. *Entrepreneurship development, First edition*.Himalaya publication house, Mumbai, 2015.
3. Khanna,S.S. *Entrepreneurial developmen,t*.S.Chand company limited, New Delhi, 2016.
4. Bendre, M., Ashok and Ashok Kumar, *A. Text Book of Practical Botany 10th edition*. Rastogi Publications, Meerut, 2020.

5. Singh, R and U.C. Singh. *Modern mushroom cultivation, 3d Edition*. Agrobios (India), Jodhpur, 2020.

REFERNCES

Books

1. Lal,G.,Siddhapa,G.S.andTandon,G.L. *Preservation of fruits and vegetables*. Indian Council of Agricultural Research (ICAR), 1988.
2. Ranganna,S. *Handbook of analysis and quality control of fruits and Vegetable products, Second edition*, Tata Mc Graw hill, New Delhi.ISBN: 780074518519, 2001.

Web Sources

1. https://store.pothi.com/book/ebook-priya-lokare-botanical-entrepreneurship/
2. https://www.taylorfrancis.com/chapters/mono/10.1201/b14920-15/value-added-products-microalgae-faizal-bux
3. https://www.amazon.in/Microalgae-Biotechnology-Health-Value-Products-ebook/dp/B0845QXPY3
4. https://www.elsevier.com/books/value-addition-in-food-products-and-processing-through-enzyme-technology/kuddus/978-0-323-89929-1

SRI KALISWARI COLLEGE (AUTONOMOUS),SIVAKASI
DEPARTMENT OF BOTANY
UG Programme - B.Sc. Botany
SEMESTER – V
ELECTIVE COURSE GENERIC/DISICIPLINE SPECIFIC - VI: EMERGING MOLECULAR TECHNIQUES (23UBYO54)
(From 2023-2024 onwards)

HOURS/WEEK : 3(L-2,T-1) **INT.MARKS : 25**
CREDITS : 2 **EXT. MARKS : 75**
DURATION : 45 hrs **MAX.MARKS :100**

Course Objectives

- To explain basic principle and working mechanism of spectrometric techniques.
- To know the principle and working mechanism of electrophoresis.
- To acquire knowledge on types of PCR.
- To explain the working mechanism of sequencing methods.

Course Outcomes (CO)

On successful completion of the course, the learners will be able to
CO1[K1]: describe the molecular techniques.

CO2[K2]: demonstrate the chromatographic techniques
CO3[K3]: perform the electrophoresis

CO4[K4]: analyse DNA sequence by using PCR techniques

CO5[K5]: examine the genome sequence

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K1]	3	2	3	1	1	1	-
CO2[K2]	2	3	2	2	1	1	1
CO3[K3]	3	2	2	1	-	1	1
CO4[K4]	3	2	2	1	-	-	-
CO5[K5]	2	2	3	2	1	1	-
Weightage of the course	13	11	12	07	03	04	02
Weighted percentage ofCourse contribution to POs	2.35	2.19	3.01	1.6	1.02	1.39	0.65

Based on the level of contribution ('3'-High, '2'-Medium, '1'-Low '-' No Correlation

UNIT I **(9 hrs)**

Spectrophometric Techniques: Principle and applications of UV-Vis spectrophotometry – IR spectrophotometer – Atomic Absorbance Spectra (AAS) and Mass Spctroscopy. Chromatographic Techniques: Principle and applications of Gas Chromatography (GC-MS) – High Performance Liquid Chromatography (HPLC).

UNIT I I **(9 hrs)**

Electrophoresis: Principle and application of Electrophoresis. Paper electrophoresis – Agarose Gel Electrophoresis – Polyacrylamide Gel Electrophoresis (Native PAGE and SDS- PAGE).

UNIT III **(9 hrs)**

PCR Techniques: Principle and applications of PCR techniques – Types of PCR – Enzymology – Primer types – methods. PCR amplification for Detection of mutation – Basics of Isothermal PCR.

UNIT IV **(9 Hrs)**

Molecular Sequencing: Gene Sequencing and analysis, DNA sequencing – Enzymatic and chemical methods and new generation sequencing. Hybridization Techniques: Southern, Northern and Dot blots. Microarray Techniques: Oligonucleiotide array and cDNA array and its applications. Amino acid sequencing - Western - MALDI- TOF.

UNIT V **(9 hrs)**

Genome Analysis: Genome sequencing and Basics of Physical mapping and genome analysis. Restriction Fragment Length Polymorphism (RFLP) technique. Random Amplified polymorphic DNA (RAPD) technique.

TEXTBOOKS

1. James D.Watson, Michael Gilman, Jan Wit Koeski and Mark Zuller. *RecombinantDNA*. 2nd Ed. Scientific American Book, New York, 2001.
2. Lewin,B. *Genes VII.* Oxford University Press, 2000.
3. Gardener, E.J. *et al*. *Principles of Genetics.* 8thEdition. John Wiley & Sons, NewYork, 1991.

REFERENCES

Books

1. Glick, B.R. and Pasternak, J.J. *Molecular Biotechnology*. ASM Press, WashingtonDC., 1994.
2. Cooper, G.M., and Hausman, R.E., *The Cell: A Molecular Approach.* 5th edition. ASM
3. Press and Sunderland, Washington, D.C.; Sinauer Associates, MA., 2009.
4. De Robertis, E.D.P., and De Robertis, E.M.F., *Cell and Molecular Biology*. 8th edition. Lippincott Williams and Wilkins, Philadelphia, 2006.

Web Sources

1. https://www.labome.com/method/Current-PCR-Methods.html#:~:text=The%20Polymerase%20chain%20reaction%20(PCR,by%20a%20DNA%20Polymerase%20enzyme.

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF BOTANY
UG Programme - B.Sc. Botany
SEMESTER – V
ELECTIVE COURSE GENERIC/DISCIPLINE SPECIFIC - VI: PLANT RESOURCES AND UTILIZATION (23UBYO55)
(From 2023-2024 onwards)

HOURS/WEEK: 3(L-2,T-1) **INT.MARKS: 25**
CREDITS : 2 **EXT. MARKS: 75**
DURATION : 45 hrs **MAX.MARKS:100**

Course objectives

- To explain the useful parts and its applications of cereals.
- To know the useful parts and its applications of Medicinal plants.
- To import knowledge on morphology and uses of medicinal plants.
- To know the extraction of active components from plants.

Course Outcomes (CO)

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

CO1[K1]: list the important medicinal plants

CO2[K2]: illustrate the characteristic features of the medicinal plants

CO3[K3]: organize the latex, fibres, timber, beverages, resin and gums yielding plants

CO4[K4]: inspect the production of biodiesel from plant

CO5[K5]: separate the oil, fibres, cotton and jute from the economic important plants

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K1]	3	2	3	1	1	1	-
CO2[K2]	2	3	2	2	1	1	1
CO3[K3]	3	2	2	1	-	1	1
CO4[K4]	3	2	2	1	-	-	-
CO5[K5]	2	2	3	2	1	1	-
Weightage of the course	13	11	12	07	03	04	02
Weighted percentage ofCourse contribution to Pos	**2.35**	**2.19**	**3.01**	**1.6**	**1.02**	**1.39**	**0.65**

Based on the level of contribution ('3'-High, '2'-Medium, '1'-Low '-' No Correlation)

UNIT I **(9 hrs)**

Brief Study of the Following Economic Produces with Special References to Botanical Name, Family and Morphology of Useful Parts and Uses: Cereals- Paddy and Wheat, Pluses- Red Gram and Soya Beans, Vegetables- Tomato and Potato, Fruit-Apple and Mango.

UNIT II **(9 hrs)**

Brief Study of the Following Economic Produces With Special References to Botanical Name, Family and Morphology of Useful Parts and Uses: Drugs- Cinchona and Ashwagandha. Narcotic- Tobacco and Hasish (Canabis). Timber- Teak and Rose Wood. Resin and Gums- Oleoresin and Canada Balsam.

UNIT III **(9 hrs)**

Brief Study of the Following Economic Produces With Special References to Botanical Name, Family and Morphology of Useful Parts and Uses: Latex – Ruber Gutta Percha. Fibre-Cotton and Jute. Oil- Coconut Oil and Gingelly Oil, Beverages – Cocoa and Coffee.

UNIT IV **(9 hrs)**

Brief Study of the Following Economic Produces with Special References to Botanical Name, Family and Morphology of Useful Parts and Uses: Spices and Condiments: Garlic, Cardamom, Ginger and Pepper. Medicinal Plants: *Digitalis purpurea*, *Rauvolfia serpentine, Catharanthus roseus* and *Curcuma longa*. Essential Oil: Lemon Grass Oil and Sandal Wood Oil.

UNIT V **(9 hrs)**

Extraction & Processing: Methods of Processing of Tea and Eucalyptus Oil. Extraction of Biodiesel from *Jatropha Curcus* and *Pungamia Glabra.*

TEXTBOOKS

1. Pandey, B.P. *Economic Botany*. S.Chand and Company PVT.LTD, New Delhi, 2015.
2. Pandey. B.P. *A Text book of Economic Botany*. S.Chand and Company, New Delhi,2017.
3. Dutta, A.C. *Botany for Degree learners*. Oxford University press, 2004.

REFERENCE

Books

1. Pandey. B.P. *A Text book of Economic Botany*. S.Chand and Company, New Delhi,1977.

2. Sambamurthy, A.V.S.S. *A Text Book of Economic Botany*. Wiley Eastern Private limited, 1989.

Web Sources

1. https://www.sciencedirect.com/topics/pharmacology-toxicology-and-pharmaceutical-science/digitalis-purpurea
2. https://www.sciencedirect.com/topics/agricultural-and-biological-sciences/catharanthus-roseus
3. https://patents.google.com/patent/EP2286678A1/en#:~:text=An%20essential%20oil%20constituent%20is,Macrocarpal%20A%2C%20Macrocarpal%20B%20and essential

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF BOTANY
UG Programme - B.Sc. Botany
SEMESTER – V
ELECTIVE COURSE GENERIC/DISCIPLINE SPECIFIC – VI: PROSPECTIVES OF MEDICINAL PLANTS (23UBYO56)
(From 2023-2024 Batch onwards)

HOURS/WEEK: 3(L-2, T-1) **INT. MARKS: 25**
CREDITS : 2 **EXT. MARKS: 75**
DURATION : 45 hrs **MAX. MARKS: 100**

Course Objectives

- To acquire knowledge on history and the concepts of ethanobotany.
- To give knowledge on conservation of medicinal plants.
- To know the uses of medicinal plants.
- To give information about thefruits and vegetables used by tribals.

Course Outcomes (CO)

On successful completion of the course, the learners will be able to
CO1[K1]: identify the medicinal plants and describe its external morphology
CO2[K2]: demonstrate the process and storage of medicinal plants
CO3[K3]: perform various medical practices in ethno botany
CO4[K4]: classify the Indian system of medicine and commercialization of products
CO5[K5]: inspect the conservation process of medicinal plants

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K1]	3	2	3	1	1	1	-
CO2[K2]	2	3	2	2	1	1	1
CO3[K3]	3	2	2	1	-	1	1
CO4[K4]	3	2	2	1	-	-	-
CO5[K5]	2	2	3	2	1	1	-
Weightage of the course	13	11	12	07	03	04	02
Weighted percentage of Course contribution to Pos	**2.35**	**2.19**	**3.01**	**1.6**	**1.02**	**1.39**	**0.65**

Based on the level of contribution ('3'-High, '2'-Medium, '1'-Low, '-' No Correlation)

UNIT I **(9 hrs)**

Ethnobotany: Introduction – Concept – Scope and Objectives of ethnobotany. History of Traditional Medicines and Ethnomedicine. Approaches in Ethnobotany. Ethnic Groups in Tamil Nadu. Conservation methods of RET medicinal plants.

UNIT II **(9 hrs)**

Ethnomedicinal Plants: Importance – Role in Human Health Care. Methodology of Ethnobotanical Studies: Data collection by Questionnaires. Field and Lab protocol for Ethanobotany. Contribution of AICRPE and FRLHD to Ethanobotany of India

UNIT III **(9 hrs)**

Ethnomedicobotanical sources in India. Traditional Knowledge and Utility of Some Medicinal Plants in Tamil Nadu: *Centella asiatica – Cissus quatrangularis – Solanum trilobatum – Cardiospermum halicacabum – Vitex negundo – Andrograpis paniculata – Eclipta alba.*

UNIT IV **(9 hrs)**

Plants Used by the Tribals: Food Plants – Tubers and Leafy Vegetables. Beverages – Tea and Cocao. Timber yielding plants - Teak and Sandal. Resins – Benzoin. Religious – Nagalingam and miscellaneous - Honey.

UNIT V **(9 hrs)**

Ethno-pharmacology: Classification and Source of Plant Crude drugs - Quality, Safety and its Efficacy. Herbal-medicine industry – land use development – agriculture – forestry – betterment of rural livelihoods and education.

TEXTBOOKS

1. Gokhale, S.B., Kokate, C.K. and Gokhale, A. *Pharmacognosy of Traditional Drugs*.1st edition. Nirali Prakashan, Pune. 2016.
2. Joshi, S.G. *Medicinal Plants*. Oxford & IBH Publishing C., Pvt., Ltd., New Delhi.2018.
3. Kumar, N. *A Textbook of Pharmacognosy*. AITBS Publishers, India. 2018.
4. Premendra Singh. *Medicinal Plants: Conservation, Cultivation and Utilization*.Daya Publishing House, New Delhi. 2013.

REFERENCES

Books

1. Albuquerque, U.P., Ramos, M.A., Júnior, W.S.F., and De Medeiros, P.M.*Ethnobotany for beginners*. Springer International Publishing, US. 2017.
2. Qadry, J.S. *A textbook of Pharmacognosy Theory and Practicals*. 17th edition. CBSPublishers and Distributors, New Delhi. 2014.
3. Singh, V. *Ethnobotany and Medicinal Plants of India and Nepal* (Vol. 3).

ScientificPublishers. New Delhi. 2009.

Web Sources

1. https://shodhganga.inflibnet.ac.in/bitstream/10603/116454/7/07_chapter%20 1.pdf
2. https://libstore.ugent.be/fulltxt/RUG01/002/217/123/RUG01-002217123_2015_0001_AC.pdf
3. https://www.researchgate.net/publication/237405658_Ethnobotany_and_phyt omedicine_of_the_upper_Nyong_valley_forest_in_Cameroon

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI

UG PROGRAMME

SEMESTER –V

VALUE EDUCATION (23UVED51)

(From 2023 - 2024 Batch onwards)

HOURS/WEEK : 2 (T-2, L-) **INT. MARKS: 25**
CREDITS : 2 **EXT. MARKS: 75**
DURATION : 30 hrs **MAX.MARKS: 100**

Course Objectives

- To inculcate the values towards personal development
- To know the social values for the global development
- To ensure the modern challenges of Adolescent
- To be aware of human right
- To enrich the knowledge to control the mind

Course Outcomes (CO)

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

CO1[K1]: identify the basic human values and ethics necessary for harmonious human relationship

CO2 [K2]: explain the significance of social values and religious tolerance to live in peace

CO3[K3]: articulate the life-changing principles of brotherhood, honesty, loyalty and community solidarity

CO4[K4]: analyse emotional, social, spiritual attribute to acquire well balanced personality

CO5[K5]: assess the importance of harmonious living in the multi-cultural pluralistic society

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1 [K1]	2	1	-	1	1	-	2
CO2 [K2]	2	1	-	1	2	1	2
CO3 [K3]	2	1	-	1	2	1	1
CO4 [K4]	1	1	1	1	2	1	1
CO5 [K5]	1	1	-	1	2	1	1
Weightage of the course	08	05	01	05	09	04	07
Weighted percentage of Course contribution to POs	**1.45**	**0.99**	**0.25**	**1.14**	**3.05**	**1.39**	**2.26**

Based on the level of contribution ('3'-High, '2'-Medium, '1'-Low '-' No Correlation)

UNIT I – CONCEPT OF HUMAN VALUES, VALUE EDUCATION TOWARDS PERSONAL DEVELOPMENT (6 hrs)

Aim of Education and Value Education; Evolution of Value Oriented Education; Concept of Human Values; Types of Values; Components of Value Education**. Personal Development:** Self Analysis and Introspection; Sensitization Towards Gender Equality, Physically Challenged, Intellectually Challenged. Respect to - Age, Experience, Maturity, Family Members, Neighbours, Co-Workers. **Character Formation towards Positive Personality:** Truthfulness, Constructivity, Sacrifice, Sincerity, Self-Control, Altruism, Tolerance, Scientific Vision.

UNIT II – VALUE EDUCATION TOWARDS NATIONAL AND GLOBAL DEVELOPMENT (6 hrs)

National and International Values: Constitutional or national values - Democracy, socialism, secularism, equality, justice, liberty, freedom and fraternity. Social Values - Pity and probity, self-control, universal brotherhood. Professional Values - Knowledge thirst, sincerity in profession, regularity, punctuality and faith. Religious Values - Tolerance, wisdom, character. Aesthetic values - Love and appreciation of literature and fine arts and respect for the same. National Integration and international understanding.

UNIT III – IMPACT OF GLOBAL DEVELOPMENT ON ETHICS AND VALUES (6 hrs)

Conflict of cross-cultural influences, mass media, cross-border education, materialistic values, professional challenges and compromise. Modern Challenges of Adolescent Emotions and behavior; Sex and spirituality: Comparision and competition; positive and negative thoughts. Adolescent Emotions, arrogance, anger, sexual instability, selfishness, defiance

UNIT IV – THERAUPATIC MEASURES (6 hrs)

Control of the mind through

1. Simplified physical exercise
2. Meditation – Objectives, types, effect on body, mind and soul
3. Yoga – Objectives, Types, Asanas
4. Activities: (i) Moralisation of Desires (ii) Neutralisation of Anger (iii)Eradication of Worries (iv)Benefits of Blessings

UNIT V – HUMAN RIGHTS **(6 hrs)**

Concept of Human Rights – Indian and International Perspectives - Evolution of Human Rights - Definitions under Indian and International documents - **Broad classification of Human Rights and Relevant Constitutional Provisions -** Right to Life, Liberty and Dignity - Right to Equality - Right against Exploitation - Cultural and Educational Rights - Economic Rights - Political Rights - Social Rights - **Human Rights of Women and Children -** Social Practice and Constitutional Safeguards - Female Foeticide and Infanticide - Physical assault and harassment - Domestic violence - Conditions of Working Women - **Institutions for Implementation -** Human Rights Commission – Judiciary - Violations and Redressel - Violation by State - Violation by Individuals - Nuclear Weapons and terrorism - Safeguards.

REFERENCES

BOOKS

1. Pitchaikani Prabhaharan, A. Babu Franklin, M.Archana Devi, *Value education*, Sri Kaliswari College (Autonomous), Sivakasi, 2017.
2. Subramanyam, K. *Values in Education*, Ramana Publications, 1995
3. Swamy Chidbhavananda, *Indian National Education*, Publication by Ramakirshna Tapovanam.

Web Sources

1. https://www.youtube.com/watch?v=ruKY3GqBvYQ.
2. https://www.republicworld.com/technology-news/science/15-famous-indian-scientists-list-know-what-were-their-innovations.html.
3. https://www.youtube.com/watch?v=M9_l9DDvEsw.

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF BOTANY
UG Programme - B. Sc. Botany
SEMESTER- V
INTERNSHIP / INDUSTRIAL TRAINING (23UBYJ52)
(From 2023-2024 Batch onwards)

HOURS/WEEK: - **INT.MARKS: 25**
CREDITS : 2 **EXT.MARKS: 75**
DURATION : 25 Days **MAX.MARKS:100**

Course Objectives

- To learn and develop new skills relevant to the field of study or career interests.
- To broaden knowledge and explore potential career paths.
- To apply the knowledge gained in academic studies to real-world scenarios.
- To bridge the gap between classroom learning and professional life.
- To gain exposure to different tasks, projects, and challenges relevant to the chosen field.

Course Outcomes (CO)

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

CO1[K1]: identify different career paths within the industry and gain insights into potential future roles

CO2[K3]: apply theoretical concepts and academic knowledge to real-world situations and challenges encountered during the internship

CO3[K4]: analyse problems, generate innovative solutions, and make informed decisions

CO4[K5]: evaluate how to manage time effectively and prioritize tasks to meet deadlines and deliver quality work

CO5[K6]: create a portfolio of the work, projects, and achievements during the internship

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K1]	3	2	-	1	1	1	2
CO2[K3]	2	3	-	1	-	1	2
CO3[K4]	2	2	-	2	-	1	1
CO4[K5]	-	2	1	-	-	1	1
CO5[K6]	1	3	3	3	-	1	2
Weightage of the course	08	12	04	07	01	05	08
Weighted percentage of Course contribution to POs	**1.45**	**2.39**	**1**	**1.6**	**0.34**	**1.74**	**2.58**

Based on the level of contribution ('3'-High, '2'-Medium, '1'-Low '-' No Correlation)

Rules and Regulations

1. Each Student has to undergo 25 days institutional/industry based training during the fourth semester summer vacation.
2. Internships could be undertaken in different organizations, industries and agencies which should be approved by the department.
3. Students should keep a detailed record of activities performed and hours spent in training and report the same to the Faculty Coordinator/Mentor/Guide regularly about the progress of internship on weekly basis
4. At the end of the internship, the student must submit a full-fledged detailed internship report (not exceeding 20 pages) along with attendance certificate
5. The Internship carries 100 marks out of which 25 marks for Internal and 75 Marks for External.
6. The viva voce board shall consist of the Head of the Department and the Internal Examiner (Senior Faculty member)
7. The training programme shall be evaluated as per the following pattern

Internal (25 Marks)		**External (75 Marks)**	
Training Review	: 15 Marks	Training Report	:25 Marks
Daily Log Report	: 5 Marks	Viva Voce	: 50 Marks
PPT Presentation	:5 Marks		

EACH INTERNSHIP REPORT WILL FOLLOW THE FORMAT DESCRIBED:

- Title Page
- College Certificate Page
- Internship Certificate provided by the internship institution
- Declaration Page
- Acknowledgement
- Company Profile
- Organizational structure of the concern
- Weekly work plan
- List of figures, List of Tables
- Index
- Chapters

List of Chapters

1. Introduction
2. Nature of work
3. Role in the organization
4. Questionnaires and Observations about work
5. Operating Environment
6. Detailed Description of Technology used
7. Implementation
8. Conclusion
9. Appendix

Text Format in the report : Times New Roman 12 with 1.5 lines
Margins 1.5" left and 1" all other

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI

DEPARTMENT OF BOTANY

UG Programme - B.Sc. Botany

SEMESTER – VI

CORE COURSE - XV: PLANT ECOLOGY AND PHYTOGEOGRAPHY (23UBYC61)

(From 2023-2024 Batch onwards)

HOURS/WEEK: 5 (L-4,T-1) **INT.MARKS: 25**

CREDITS : 3 **EXT. MARKS: 75**

DURATION : 75 hrs **MAX.MARKS:100**

Course Objectives

- To relate the significance of the biotic and abiotic components of the ecosystem.
- To understand the energy flow in the ecosystem.
- To conceptualize the biodiversity
- To know the implication of pollution on the environment.
- To familiarize with the phytogeography.

Course outcomes (CO)

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

CO1[K1]: relate to the significance of the biotic and abiotic components of the ecosystems and energy flow

CO2[K2]: summarize the phytogeographical division of India

CO3[K3]: explain the implication of pollution on the environment

CO4[K4]: analyze the implications of functional and behavioral ecology in natural and man-made areas, biodiversity and conservation

CO5[K5]: develop mitigations for the effective conservation of biodiversity and disaster management

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K1]	3	2	2	2	3	2	2
CO2[K2]	3	3	3	2	3	3	3
CO3[K3]	2	3	3	2	3	3	3
CO4[K4]	3	3	3	2	3	3	3
CO5[K5]	3	3	3	3	3	3	3
Weightage of the course	14	14	14	11	15	14	14
Weighted percentage of Course contribution to POs	**2.53**	**2.78**	**3.51**	**2.51**	**5.08**	**4.88**	**4.52**

Based on the level of contribution ('3'-High, '2'-Medium, '1'-Low '-' No Correlation)

UNIT I **(15 hrs)**

Biotic and abiotic factors and their influence on vegetation – a brief account of microbes, plants, animals, soil, wind, light, temperature, rainfall, and fire. Autecology and Synecology – Vegetation – UNITs of Vegetation – Formation, Association, Consociation, Society – development of vegetation. Migration – ecesis, colonization, Methods of study of vegetation (Quadrat and transect). Plant succession –Hydrosere and Xerosere. Ecological classification of plants: Morphological and anatomical features of plants and their correlation to the habitat factors.

UNIT II **(15 hrs)**

Structure, trophic organization; food chains and food web, energy flow in an ecosystem. Types of ecosystems: pond, forest and grassland. Ecological pyramids and Biogeochemical cycles of carbon and nitrogen and phosphorus.

UNIT III **(15 hrs)**

Biodiversity: Ecosystem/commUNITy, species and genetic diversity. Endemism and hotspots, Natural resources and its conservation (*In situ* and *ex situ*).

UNIT IV **(15 hrs)**

Pollution- Types of pollution: Primary and secondary and their impacts: Air - Green house effect, global warming, ozone depletion, acid rain, Water, soil-causes and consequences. Remedial measures – Green building. Disaster management.

UNIT V **(15 hrs)**

Phytogeography Introduction- continuous and discontinuous distribution, Phytogeography of India, Vegentational regions of India,. Plant indicators. Diversification of land plants. Speciation Changing Earth. Island Biogeography. Plant Biodiversity and its importance.

Definition, levels of biodiversity-genetic, species and ecosystem. Biodiversity hotspots- Criteria, Biodiversity hotspots of India. Loss of biodiversity – causes and conservation (*In situ* and *ex situ* methods). Seed banks - conservation of genetic resources and their importance. Consequences of deforestation and exploitation of targeted species; Forest conservation, Social forestry and Participatory Management of Forest. Concept of degeneration and regeneration of plants.

TEXTBOOKS

1. Singh, J.S., Singh, S.P., Gupta, S. *Ecology Environment and Resource Conservation*. Anamaya Publications, New Delhi, India, 2006.

2. Sharma, P.D. *Ecology and Environment*. Rastogi Publications, 2009.
3. Sharma, P.D. *Ecology and Environment*. Rastogi Publications, Meerut, India.8th edition, 2010.

REFERENCES

Books

1. Odum, E.P. *Fundamentals of ecology*. Cengage Learning India Pvt. Ltd., New Delhi. 5th edition, 2005.
2. Wilkinson, D.M. *Fundamental Processes in Ecology: An Earth Systems Approach*. Oxford University Press. U.S.A, 2007.
3. Ambasht, R.S. . A textbook of plant ecology 15ed (pb 2019). CBS Publishers Distributors, 2017.

Web Sources

1. https://www.kobo.com/us/en/ebook/plant-ecology-3.
2. https://www.worldcat.org/title/plant-ecology/oclc/613206385
3. https://books.google.co.in/books/about/Plant_Ecology.html?
4. https://www.kopykitab.com/Plant-Ecology-by-Agrawal-AK-And-Deo-PP 5. http://www.freebookcentre.net/Biology/Ecology-Books.html
5. https://www.amazon.in/Plant-Ecology-Ernst-Detlef-Schulze/dp/354020833X
6. https://www.tandfonline.com/toc/tped20/current (Plant Ecology and Diversity)
7. https://link.springer.com/journal/11258 (Plant Ecology)

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF BOTANY
UG Programme - B.Sc. Botany
SEMESTER – VI
CORE COURSE - XVI: PLANT BIOTECHNOLOGY AND MOLECULAR BIOLOGY
(23UBYC62)
(From 2023-2024 Batch onwards)

HOURS/WEEK: 5(L-3, T-1) **INT.MARKS: 25**
CREDITS : 3 **EXT. MARKS: 75**
DURATION : 75 hrs **MAX.MARKS:100**

Course Objectives

- To know the various aspects of biotechnology.
- To understand the concepts and techniques of plant tissue culture.
- To familiarize with the gene transfer techniques.
- To explain about DNA replication and repair.
- To understand the concept of gene regulation.

Course outcomes (CO)

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

CO1[K1]: define the fundamentals concepts of plant biotechnology and genetic engineering and central dogma

CO2[K2]: explain various steps in transcription, protein synthesis and protein modification

CO3[K3]: elucidate gene cloning and evaluate different methods of gene transfer

CO4[K4]: analyze the major concerns and applications of transgenic technology

CO5[K5]: develop their competency on different types of plant tissue culture

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K1]	3	3	3	2	3	3	3
CO2[K2]	3	3	3	2	2	2	3
CO3[K3]	3	3	3	2	2	2	3
CO4[K4]	3	3	3	2	3	3	3
CO5[K5]	3	3	3	2	3	3	3
Weightage of the course	15	15	15	10	12	13	15
Weighted percentage of Course contribution to POs	**2.71**	**2.98**	**3.76**	**2.28**	**4.07**	**4.53**	**4.84**

Based on the level of contribution ('3'-High, '2'-Medium, '1'-Low '-' No Correlation)

UNIT I **(15 hrs)**

Biotechnology – definition, history and scope. Application of plant biotechnology in various fields. Agriculture - Biofertilizers, Biopesticides. Medicine – Antibiotics (Penicillin) Recombinant vaccines, insulin and interferons. Environment – Bioremediation and Biofuel. Industry – ethanol production (yeast), citric acid production (*Aspergillus niger*) and Proteases production (*Bacillus sps*).

UNIT II **(15 hrs)**

Plant tissue culture - introduction, scope and importance, concept of totipotency, aseptic techniques in plant tissue culture. Composition of media, types of media, sterilization, explant preparation and inoculation. Callus induction and micropropogation. Application of plant tissue culture in agriculture, horticulture and forestry. Synthetic seed technology.

UNIT III **(15 hrs)**

Vectors; plasmid, bacteriophage, viral vectors, cosmids. Restriction enzymes. Recombinant DNA technology, gene transfer – indirect method, *Agrobacterium* mediated gene transfer. Direct method – Biolistic method. Development of transgenic plants with reference to insect resistance, Pros and cons of GM food

UNIT IV **(15 hrs)**

Nature and function of genetic materials, Nucleic acid – base paring – Chargaff's rule, DNA – structure. Types, denaturation - renaturation. Replication of DNA in prokaryotes. RNA structure and types. DNA repair mechanism.

UNIT V **(15 hrs)**

Transcription – Enzymology – RNA polymerase – classes of RNA molecules – transcription in prokaryotes. Protein synthesis – Genetic code – characters – codons and anticodons. Gene regulation in Prokaryotes – *lac* operon and *trp* operon

TEXTBOOKS

1. Bhajwani, S and Razdan. *Plant tissue culture*. Theory and practice, 1984.
2. Verma P.S and Agarwal V.K. *Molecular Biology*. S Chand Publishers, 2010.
3. Ignacimuthu, S.J. *Plant Biotechnology*. Oxford & IBH Publishing, New Delhi, 2003.
4. Bhojwani, S.S and Razdan, M.K. *Plant Tissue Culture*. Read Elsevier India Pvt. Ltd, 2004.
5. Purohit, S.S. *Plant tissue culture.* Student edition, Jodhpur, 2010.

REFERENCES

Books

1. Bernard R Glick and Jack J Pasternak. *Molecular biotechnology-principles and applications of recombinant DNA, (2nd Edition).* ASM Press, Washington, D.C, 2001.
2. Ernst L. Winnaccker. *From Genes to Clones-introduction to gene technology*, VCR Pub., Weintein, 2002.
3. Maniatis and Sambrook. Molecular Cloning- A lab manual Vol.I, II & III, Coldspring Harbor Laboratory Press, New York, 2003.
4. Hammond, J.C. McGarvey and V. Yusibov. *Plant Biotechnology.* Springer Verlag. New York, 2009.

Web Sources

1. http://www.freebookcentre.net/Biology/BioTechnology-Books.html
2. https://books.google.co.in/books/about/Introduction_to_Plant_Biotechnology.html?id=RgQLISN8zT8C
3. https://www.kobo.com/us/en/ebook/plant-biotechnology-1
4. https://www.kobo.com/us/en/ebook/plant-biotechnology-1
5. https://www.worldcat.org/title/molecular-biology/oclc/1062496183
6. http://www.freebookcentre.net/Biology/Molecular-Biology-Books.html
7. https://www.amazon.in/Molecular-Biology-Multicolour-Verma-Agarwal-ebook/dp/B06XKVVWT3

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF BOTANY
UG Programme - B.Sc. Botany
SEMESTER – VI
CORE COURSE - XVII: PLANT PHYSIOLOGY AND PLANT BIOCHEMISTRY
(23UBYC63)
(From 2023-2024 onwards)

HOURS/WEEK: 5 (L-4,T-1) **INT.MARKS: 25**
CREDITS : 3 **EXT. MARKS: 75**
DURATION : 75hrs **MAX.MARKS:100**

Course Objectives

- To relate to water relation of plants with respect to various physiological phenomenon.
- To know the pathways of photosynthesis.
- To explain and understand respiration and nitrogen metabolism.
- To know about plant growth regulators.
- To familiarize with plant diversity.

Course outcomes (CO)

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

CO1[K1]: relate to water relation of plants with respect to various physiological phenomenon.

CO2[K2]: explain the process and significance of photosynthesis and respiration

CO3[K3]: elucidate properties of nutrients and their deficiency symptoms in plants.

CO4[K4]: analyze the biological role of plant growth regulators, carbohydrates, proteins, lipids, nucleic acids and enzymes.

CO5[K5]: decipher the phenomenon of seed dormancy and germination in plants.

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K1]	3	3	3	1	2	2	2
CO2[K2]	3	3	3	1	2	2	2
CO3[K3]	2	2	2	1	2	2	2
CO4[K4]	3	3	3	1	2	2	2
CO5[K5]	3	3	3	1	2	2	2
Weightage of the course	14	14	14	5	10	10	10
Weighted percentage of Course contribution to POs	**2.53**	**2.78**	**3.51**	**1.14**	**3.39**	**3.48**	**3.23**

Based on the level of contribution ('3'-High, '2'-Medium, '1'-Low '-' No Correlation)

UNIT I **(15 hrs)**

Water Relations **-** Properties of water—imbibition, diffusion, osmosis and plasmolysis- ascent of sap, mechanism of water absorption – active and passive, apoplast and symplast pathway. Transpiration – types and factors affecting transpiration and significance. Opening and closing of stomata- mechanisms and theories of transpiration.

UNIT II **(15 hrs)**

Photosynthesis - Radiant energy, Photosynthetic UNIT, photosynthetic pigments and their role, photo systems, path of carbon in photosynthesis - Light reaction, electron transport system in the chloroplast (Z-Scheme). Dark reaction - C3 cycle, C4 cycle, CAM pathway, Photorespiration.

UNIT III **(15 hrs)**

Respiration**-**Aerobic, Glycolysis, Krebs Cycle, Electron Transport System, oxidative phosphorylation, respiratory quotient, Anaerobic- fermentation - Respiratory quotient. Nitrogen Metabolism **-** Biological nitrogen fixation, nitrogen cycle

UNIT IV **(15 hrs)**

Growth **-** Growth – plant growth regulators (auxins, gibberellins, cytokinins, ethylene and abscisic acid) - Practical applications - Photo morphogenesis – photoperiodism – vernalization – dormancy- phytochromes. Stress Physiology **-** Concepts of plant responses to stresses (water, salt, temperature).

UNIT V **(15 hrs)**

Plant Biochemistry **-**Classification, properties and biological role of carbohydrates, proteins, lipids and nucleic acids. Enzyme – properties – classification – nomenclature of enzymes – mode of enzyme action – factors influencing enzyme action.

TEXTBOOKS

1. Noggle and Fritz. *Introductory Plant Physiology*. Prentice Hall, New Delhi, 1976.
2. Pandey, SN and Sinha, BK. *Plant Physiology*. Vikas Publishing House Ltd., New Delhi, 1989.
3. Westhoff, P. *Molecular Plant Development from Gene to Plant*. Oxford University Press, Oxford, UK, 1998.
4. Jain, V.K. Fundamentals of Plant Physiology, S.Chand and Company Ltd., New Delhi, 2006.
5. Verma,V. 2008. Textbook of plant Physiology, Ane's student edition, New Delhi.

REFERENCES

Books

1. Dennis, D.T., Turpin, D.H., Lefebvre, D.D and Layzell, D.B. (Eds) . *Plant Metabolism (second edition)*. Longman Essex, England, 1997.
2. Hooykaas, P.J.J., Hall M.A and Libbenga, K.R. *Biochemistry and Molecular Biology of Plant Hormones.* Elsevier, Amsterdam, The Netherlands, 1999.
3. Nobel, P.S. *Physiochemical and Environmental Plant Physiology* (second edition), Academic Press, San Diego, USA, 1999.
4. Singhal, G.S., Renger, G., Sopory, S.K., Irrgang, K.D and Govindjee. *Concepts in Photobiology: Photosynthesis and Photo morphogenesis*. Narosa Publishing House, New Delhi, 1999.
5. Buchanan, B.B., Gruissem, W and Jones, R.L. *Biochemistry and Molecular Biology of Plants*, American Society of Plant Physiologists, Maryland, USA, 2000.

Web Sources

1. https://www.kobo.com/us/en/ebook/biochemistry-and-molecular-biology-of-plants
2. https://www.amazon.in/Plant-Biochemistry-Hans-Walter-Heldt-ebook/dp/B004FV4RS6
3. https://www.kobo.com/us/en/ebook/plant-biochemistry
4. https://www.kobo.com/us/en/ebook/a-textbook-of-plant-physiology-1
5. https://www.amazon.in/Advances-Plant-Physiology-P-Trivedi-ebook/dp/B01JP5L0YA
6. https://www.crcpress.com/Plant-Physiology/Stewart-Globig/p/book/9781926692692
7. https://www.amazon.com/Introduction-Plant-Physiology-William-Hopkins-ebook/dp/B006R6I850

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF BOTANY
UG Programme - B.Sc. Botany
SEMESTER - VI
CORE COURSE XVII: PRACTICAL - PLANT ECOLOGY, PHYTOGEOGRAPHY, PLANT BIOTECHNOLOGY, MOLECULAR BIOLOGY, PLANT PHYSIOLOGY AND BIOCHEMISTRY (23UBYC6P)
(From 2023-2024 Batch onwards)

HOURS/WEEK: 5 **INT.MARKS: 25**
CREDITS : 4 **EXT. MARKS: 75**
DURATION : 75 hrs **MAX.MARKS:100**

Course Objectives

- To study the morphological and anatomical adaptations of plants of various habitats.
- To demonstrate techniques of plant tissue culture.
- To familiarize with the structure of DNA and RNA.
- To carryout experiments related with plant physiology.
- To perform biochemistry experiments.

Course outcomes (CO)

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

CO1[K2]: examine to the distribution and adaptations of plants pertaining to their habitat

CO2[K3]: develop skills in green planning and callus culture

CO3[K4]: illustrate the basic principles involved in the plant physiology and biochemistry experiments

CO4[K5]: assess the structure and functions of DNA and RNA

CO5[K6]: estimate the biochemical components and determine the factors controlling photosynthesis and transpiration of plants

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K2]	3	3	3	2	3	3	3
CO2[K3]	2	3	3	1	2	3	3
CO3[K4]	2	3	3	1	2	3	3
CO4[K5]	3	3	3	1	2	3	3
CO5[K6]	3	3	3	1	3	3	3

Weightage of the course	15	15	15	6	12	15	15
Weighted percentage of Course contribution to POs	**2.71**	**2.98**	**3.76**	**1.37**	**4.07**	**5.23**	**4.84**

Based on the level of contribution ('3'-High, '2'-Medium, '1'-Low '-' No Correlation)

Plant Ecology and Phytogeography

1. Study of morphological and anatomical adaptations of locally available hydrophytes, xerophytes, mesophytes and halophytes and correlate to their particular habitats.

    a. Hydrophytes : *Nymphaea, Hydrilla*
    b. Xerophytes : *Nerium, Casuarina*
    c. Mesophytes : *Tridax, Vernonia*
    d. Halophytes : *Avicennia, Rhizophora*
    e. Epiphytes : *Vanda*
2. Map of the phytogeographical regions of India.
3. Quadrate study and line transect.
4. Plan for a green building.
5. Field trip to any one scrub jungle or wetland (Guindy National park/Nanmangalam Scrub jungle/Pallikaranai Marsh/Siruthavur Scrub/Vedanthangal Bird Sanctuary/Kelampakkam Marsh/Adyar Poonga).

Plant Biotechnology - Demonstration

1. Sterilization techniques in plant tissue culture.
2. MS - Media preparation.
3. Explant sterilization, Callus induction, Plantlet, hardening.

Molecular Biology – Photographs

1. DNA Structure
2. tRNA
3. DNA – Replication
4. DNA – Repair
5. Genetic code

Plant Physiology and Plant Biochemistry

1. Determination of water potential by plasmolytic method.
2. Effect of chemicals on membrane permeability.
3. Effect of environmental factors on rate of transpiration by gravimetric method.
4. Separation of plant pigments by paper chromatography.
5. Study the rate of photosynthesis under different light intensities by using Willmott's bubble counter.

6. Study of rate of photosynthesis under different wavelengths (red & blue) of light.
7. Comparison of rate of respiration of different respiratory substrates.
8. Measurement of pH of expressed cell sap and different soils using pH meter.
9. Enzyme activity – catalase
10. Biochemical test for carbohydrates, proteins and lipids

Experiments

1. Study the rate of transpiration by using Ganong's photometer
2. Demonstration of stomatal movement.
3. Induction of roots in leaves by auxins

TEXTBOOKS

1. Jackson, S.A., Kianian, S.F., Hossain, K.G and Walling, J.G. *Practical laboratory exercises for plant molecular cytogenetics. In Plant Cytogenetics*. Springer, New York, 2012.
2 Palanivelu, P. *Laboratory Manual for analytical biochemistry and separation techniques,* School of Biotechnology, Madurai Kamaraj University, Madurai, 2004.
3 Bendre, A.M. and Ashok Kumar. *A text book of practical Botany.* Rastogi Publication. Meerut. 9th Edition, 2009.
4. Sharma, P.D. *Ecology and Environment*. Rastogi Publication, Meerut, 2017.

REFERNCES

Books

1. Mick Crawley. *Plant Ecology*, 2nd Edition Wiley-Blackwell, 1996.
2. Bendre, A.M and Ashok Kumar. A text book of practical Botany. Vol. I & II. Rastogi Publication. Meerut. 9th Edition, 2009.
3. Bala, M., Gupta, S., Gupta, N.K and Sangha, M.K. *Practicals in plant physiology and biochemistry*. Scientific Publishers (India), 2013.
4. Manju Bala., SUNITa Gupta., Gupta, N.K. *Practicals in Plant Physiology and Biochemistry*. Scientific Publisher, 2012.

Web Sources

1. https://www.amazon.com/Practical-plant-ecology-beginners-commUNITies/dp/B00088FDQK
2. https://www.amazon.in/Practical-Biotechnology-Plant-Tissue-Culture/dp/8121932009
3. https://www.elsevier.com/books/molecular-biology-techniques/carson/978-0-12-815774-9
4. https://www.amazon.in/Practical-Physiology-Biochemistry-SUNITa-Sangha/dp/9386102633

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF BOTANY
UG Programme - B.Sc. Botany
SEMESTER – VI
ELECTIVE COURSE GENERIC/ DISCIPLINE SPECIFIC- VIII: HORTICULTURE
(23UBYO61)
(From 2023-2024 Batch onwards)

HOURS/WEEK: 4(L-2, T-1) **INT.MARKS: 25**
CREDITS : 3 **EXT. MARKS: 75**
DURATION : 60 hrs **MAX.MARKS:100**

Course Objectives

- To gain an understanding of the fundamentals of horticulture and techniques needed to grow and maintain plants.
- To develop skills in students to work as gardeners, therapists, designers, growers and technical advisor in the food and non food sector in horticulture.
- To know about hydrphonic culture.
- To develop the various horticultural protection.
- To impart the knowledge on market preparation.

Course outcomes (CO)

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

CO1[K1]: enumerate the concepts in horticulture and nursery management.

CO2[K2]: demonstrate a working knowledge on biology of soil, compost making, designing and planning of garden, pest, diseases and nutrient management practices.

CO3[K3]: appraise the importance of floriculture and evaluate the contribution of spices and condiments on economy.

CO4[K4]: analyze different methods of weed control in horticultural crops.

CO5[K5]: develop their competency on pre and post-harvest technology in horticultural crops.

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K1]	3	2	2	1	3	3	3
CO2[K2]	3	3	3	1	2	3	3
CO3[K3]	3	2	2	1	2	2	2
CO4[K4]	2	3	3	1	3	3	3

CO5[K5]	2	3	2	1	2	2	2
Weightage of the course	13	13	12	5	12	13	13
Weighted percentage of Course contribution to POs	**2.35**	**2.58**	**3.01**	**1.14**	**4.07**	**4.53**	**4.19**

Based on the level of contribution ('3'-High, '2'-Medium, '1'-Low '-' No Correlation)

UNIT I **(12 hrs)**

Importance and scope of horticulture. Classification of horticultural crops – fruits and vegetables. Essentials of nursery Management **-** Soil management: Garden soil, Physical and chemical properties of soil, Organic matter, Compost, Cultural practices; Water management: Water quality, Irrigation, Mulching. Nursery structures**:** Protected cultivation (greenhouses), environment controls.

UNIT II **(12 hrs)**

Hydroponic culture**-**types of container. Use of manures and fertilizers in Horticultural crop production. Principles of organic farming. Environmental factors influencing vegetable and fruit production.

UNIT III **(12 hrs)**

Horticultural crop protection; physical control - pruning. Chemical control-pesticides, fungicides. Plant propagation **-** cutting, layering, budding, grafting. Types of gardens: formal, informal, kitchen and Terrace. Indoor gardening-bottle garden. Floriculture, ornamental gardening.

UNIT IV **(12 hrs)**

A brief account of annual, biennials and perennials with reference to ornamental gardens. Green house, terrarium, water garden, rockery plants, bonsai techniques. Landscaping, principles and basic components.

UNIT V **(12 hrs)**

Technology of horticultural crops **-** market preparation: harvesting and handling, packaging and transport, storage; chemical treatment. Economics of cultivation Crops: Cardamom, pepper, clove. Food processing - freezing, bottling and canning, drying and chemical preservation.

TEXTBOOKS

1. Hartmann, H.T., D.E. Kester. *Plant propagation – principles and practices.* Half of India. New Delhi, 1989.
2. Bose, T.K., Mitra., Sadhu. Propagation of tropical and subtropical horticultural crops. Naya Prakash, 1991.

3. Rangaswami, G and Mahadevan, *A. Diseases of Crop Plants in India*. Prentice Hall of India Pvt. Ltd., New Delhi, 1999.

REFERNCES

Books

1. Arditti, A. *Orchid biology*. Gornell Univ., Press. Ithaca, 1977.
2. Biswas, T.D. *Rose growing – Principles and Practices* .Assoc Pub Co New Delhi, 1984.
3. Hartman, H.T., Kester, D.E. *Plant propagation*. Printice Hall Ltd., New Delhi, 1989.
4. Bose, T.K., Yadav, L.P. *Commercial flowers*. Naya Prakash, Calcutta, 1989.

Web Sources

1. https://www.kopykitab.com/Precision-Horticulture-by-Archarya-SK
2. https://www.ebooks.com/en-us/subjects/science-horticulture-ebooks/423/
3. http://www.agrimoon.com/horticulture-icar-ecourse-pdf-books/
4. https://www.worldcat.org/title/handbook-of-horticulture/oclc/688653648
5. https://cbseportal.com/ebook/vocational-books-horticulture
6. http://www.digitalbookindex.org/ search/search010agriculhortigardena.asp

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI

DEPARTMENT OF BOTANY

UG Programme - B.Sc. Botany

SEMESTER – VI

ELECTIVE COURSE GENERIC/DISCIPLINE SPECIFIC - VIII: NATURAL RESOURCE MANAGEMENT (23UBYO62)

(From 2023-2024 Batch onwards)

HOURS/WEEK: 4(L-2, T-1) **INT.MARKS : 25**

CREDITS : 3 **EXT. MARKS: 75**

DURATION : 60 hrs **MAX.MARKS:100**

Course Objectives

- To develop an appreciation for the natural resources and their ecological and economical impact.
- To understand various strategies of natural resource management.
- To understand the concept of different natural resources and their utilization.
- To create the models of natural resource conservation and maintenance.
- To study the significance of natural resource pertaining to economy and environment.

Course outcomes (CO)

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

CO1[K1]: describe the significance of natural resources pertaining to economy and environment

CO2[K2]: understand the concept of different natural resources and their utilization.

CO3[K3]: evaluate the management strategies of different natural resources.

CO4[K4]: analyze the sustainable utilization land, water, forest and energy resources.

CO5[K5]: design new models of natural resource conservation and maintenance.

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K1]	3	2	2	1	3	3	3
CO2[K2]	3	3	3	1	2	3	3
CO3[K3]	3	2	2	1	2	2	2
CO4[K4]	2	3	3	1	3	3	3
CO5[K5]	2	3	2	1	2	2	2

Weightage of the course	13	13	12	5	12	13	13
Weighted percentage of Course contribution to POs	**2.35**	**2.58**	**3.01**	**1.14**	**4.07**	**4.53**	**4.19**

Based on the level of contribution ('3'-High, '2'-Medium, '1'-Low '-' No Correlation)

UNIT I **(12 hrs)**

Introduction to Natural Resource Bases: Concept of resource, classification of natural resources. Factors influencing resource availability, distribution and uses. Interrelationships among different types of natural resources. Concern on Productivity issues. Ecological, social and economic dimension of resource management.

UNIT II **(12 hrs)**

Forest resources: forest vegetation, status and distribution, major forest types and their characteristics. Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forest and tribal people, forest management. Developing and developed world strategies for forestry. Land resources: Land as a resource. Dry land, land use classification, land degradation, man induced landslides, soil erosion and desertification.

UNIT III **(12 hrs)**

Landscape impact analysis, wetland ecology & management. Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems. Water ecology and management. Energy resources: Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources. Case studies Food resources: World food problems, changes caused by agriculture and over-grazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case-studies. Fish and other marine resources: Production, status, dependence on fish resource, unsustainable harvesting, issues and challenges for resource supply, new prospects.

UNIT IV **(12 hrs)**

Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies. Resource Management Paradigms: Resource management the evolution and history of resource management paradigms. Resource conflicts: Resource extraction, access and control system. Approaches in Resource Management: Ecological approach; economic approach; ethnological approach; implications of the approaches; integrated resource management strategies. Poverty and implications in Resource Management in

developing countries – Poverty in developing countries, causes and link with resources scarcity and poverty.

UNIT V **(12 hrs)**

Management of Common International Resources: Ocean, climate, International fisheries and management commissions; Antarctica: the evolution of an international resource management regime. Case Studies: 1. Resource management in mountain ecosystem 2. Dry-land ecosystem 3. The management of marine and coastal resources 4. Case study of shifting Cultivation 5. Mangrove ecosystem and their management.

TEXTBOOKS

1. Vasudevan, N. *Essentials of Environmental Science.* Narosa Publishing House, New Delhi, 2006.
2. Singh, J. S., Singh, S.P., Gupta S. *Ecology, Environment and Resource Conservation*. Anamaya Publications, New Delhi, 2006.
3. Rogers, P.P., Jalal, K.F., Boyd, J.A. *An Introduction to Sustainable Development*. Prentice Hall of India Private Limited, New Delhi, 2008.
5. Stacy Keach. *Natural Resources Management*. Syrawood Publishing House, 2016.

REFERNCES

Book

1. Cunningham, W.P., Cooper, T.H., Gorhani E., Hepworth M.T. 2001, Environmental Encyclopedia, Jaico Publishing House.

Web Sources

1. https://books.google.co.in/books/about/Natural_Resource_Management.html?id=Tz9iDMhttps://books.google.co.in/books/about/Natural_Resource_Management.html?id=Tz9iDM6crLIC&redir_esc=y
2. https://books.google.co.in/books/about/Natural_Resource_Conservation_and_Enviro.html?id=T2SRuhxpUW8C&redir_esc=y
3. https://www.amazon.in/MANAGING-NATURAL-RESOURCES-FOCUS-WATER-ebook/dp/B00OPTWHOE
4. https://www.kobo.com/us/en/ebooks/natural-resources
5. https://www.igi-global.com/chapter/natural-resources-management/195183

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF BOTANY
UG Programme - B.Sc. Botany
SEMESTER – VI
ELECTIVE COURSE GENERIC/DISCIPLINE SPECIFIC - VIII: FORESTRY
(23UBYO63)
(From 2023-2024 Batch onwards)

HOURS/WEEK: 4(L-2, T-1) **INT.MARKS: 25**
CREDITS : 3 **EXT. MARKS: 75**
DURATION : 60 hrs **MAX.MARKS:100**

Course Objectives

- To study the distribution pattern, composition and diversity of forest ecosystem.
- To understand the method of forest management principles and conservation.
- To enable them to meaningfully contribute in the forest conservation.
- To provide a platform to appreciate biodiversity and the importance.
- To raise student awareness of the need to create a sustainable way of living.

Course outcomes (CO)

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

CO1[K1]: describe the basic concepts related to forest distribution, degradation, protection, management and resource utilization.

CO2[K2]: understand complex interactions of humans and forest ecosystems in a global context.

CO3[K3]: demonstrate skills for ecological measurements and interpretation of forest ecology management.

CO4[K4]: examine and decipher the factors influencing forest vegetation, forest degradation and methods of wood preservation

CO5[K5]: develop new strategies and apply the knowledge gained for problem-solving analysis in the conservation and management of forest ecosystems.

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K1]	3	2	2	1	3	3	3
CO2[K2]	3	3	3	1	2	3	3
CO3[K3]	3	2	2	1	2	2	2
CO4[K4]	2	3	3	1	3	3	3

CO5[K5]	2	3	2	1	2	2	2
Weightage of the course	13	13	12	5	12	13	13
Weighted percentage of Course contribution to POs	**2.35**	**2.58**	**3.01**	**1.14**	**4.07**	**4.53**	**4.19**

Based on the level of contribution ('3'-High, '2'-Medium, '1'-Low '-' No Correlation)

UNIT I **(12 hrs)**

Silviculture- Forests - definition. Forest types of India and Tamil Nadu - revised classification - pure and mixed stands - even and uneven aged stands. Role of forests. Factors of locality - climatic - edaphic - topographic - biotic - interaction of forest with the environment. Regeneration - natural and artificial. Nursery techniques - containerized seedling production - techniques and methods. Vegetative and clonal propagation techniques and methods - macro and micro propagation techniques.

UNIT II **(12 hrs)**

Forest Mensuration and Management**-** Forest Mensuration - Definition and objectives. Measurement of diameter, girth, height, crown and volume of trees - methods and principles - tree stem form - form factor. Volume estimation of stand - age - basal area determinations Stem and Stump Analysis. Forest inventory - sampling techniques and methods - measurement of crops - sample plots. Yield calculation - CAI and MAI - volume, yield and stand tables preparation

UNIT III **(12 hrs)**

Forest Utilization and Wood Technology- Logging - extraction of timber - felling rules and methods - conversion methods - conversion season. Grading of timbers. Transportation of timbers - major and minor transportation methods Storage and sales of logs - sales depot - management of depots. Forest products - Timber - timber, fuel, pulp, paper, rayon and match. Wood Composites - plywood, particle board, fiber boards, MDF, hardboard, insulation boards - production technology. Non timber forest products (NTFP) - collection - processing and storage of NTFP - fibres and flosses - bamboos and canes - katha and bidi leaves - essential oils and oil seeds - gums and resins - tans and dyes .

UNIT IV **(12 hrs)**

Forest Biology and Botany-Forest ecology - definition - biotic and abiotic components - forest ecosystem - forest community - concepts - succession - primary productivity - nutrient cycling. Restoration ecology - global warming - green house effects - ozone layer depletion - acid rain - role of trees in environmental

conservation. Biodiversity- hotspots - endemism - Red Data Book. Biodiversity assessments - principles and methods.

UNIT V **(12 hrs)**

FOREST BOTANY:

Importance of botany - taxonomic classification of plant species - identification of species - composition and association. Dendrology - principles and establishment of herbaria and arboreta. Tree Improvement - Forest Genetics and Tree Breeding - Definition and concepts - Steps in tree improvement - Variation and selection - Progeny Evaluation Test (PET) - Candidate Tree, Plus Tree, Elite trees - use of provenances and seed sources - heritability and genetic gains - hybrids in tree improvement - heterosis exploitation. Seed production Area and seed orchards - types and establishment. In situ and ex situ gene conservation. Exotics - role of exotic forest trees in India - application of biotechnological methods in forestry.AGRO FORESTRY AND SOCIAL FORESTRY: Agro forestry - definition, concept and objectives. Classification of agro forestry systems - primary systems and subsystems - inheritance effects. Tree-crop interactions - above and below ground - competition for space, water, light and nutrients. Microclimatic modifications - nutrient cycling and soil fertility improvement - Allelopathy and allelochemicals. - Ecological aspects of agro forestry - benefits and limitations of agro forestry. Agro forestry practices for different agro-climatic zones of Tamil Nadu. Agro forestry practices for wasteland reclamation. Social forestry - objectives and scope and necessity - its components and implementation in local and national levels - social attitudes and community participation. JFM - principles, objectives and methodology - choice of species for agro forestry and social forestry. Urban Forestry - definition and scope - benefits - choice of tree species - planting techniques and management.

TEXTBOOKS

1. Nair, N.C and Henry, A.N. *Flora of Tamilnadu*. *India.* BSI, Coimbatore, India, 1983.
2. Manikandan, K., S. Prabhu. Indian forestry, a breakthrough approach to forest service. Jain Bros, 2013.
3. Roger Sands. *Forestry in a global context*. CAB international, 2013.

REFERNCES

Books

1. Kollmann, F.F.P., Cote, W.A. *Wood science and Technology*. Springer Verlag, New York, 1988.
2. Donald L., Grebner.Jacek P., Siry., Pete Bettinger. *Introduction to forestry and Natural resources.* Academic press. 2012

3. West, P.W. *Tree and forest measurement.* Springer international publishing Switzerland, 2015.

Web Sources

1. http://wwwwds.worldbank.org/external/default/WDSContentServer/WDSP/IB/2006/10/19/000112742_20061019150049/Rendered/PDF/367890Loggerheads0Report.pdf.
2. https://www.britannica.com/science/forestry
3. https://en.wikipedia.org/wiki/Forestry.
4. https://www.biologydiscussion.com/forest/essay-forest-importance.major-products-and-its- conservation/25119
5. https://academic.oop.com
6. https://www.cbd.int>development>doc.
7. https://www.sciencedirect.com/topics/agriculture-and-biological-science-forest-product.

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF BOTANY
UG Programme - B.Sc. Botany
SEMESTER – VI
ELECTIVE COURSE GENERIC/DISCIPLINE SPECIFIC - IX: BIONANOTECHNOLOGY (23UBYO64)
(From 2023-2024 Batch onwards)

HOURS/WEEK: 4(L-2, T-1) **INT.MARKS: 25**
CREDITS : 3 **EXT. MARKS: 75**
DURATION : 60 hrs **MAX.MARKS:100**

Course Objectives

- To provide students with comprehensive knowledge of basics in nanotechnology.
- To enable the students understand and appreciate the various applications of nanoparticles.
- To give perspective to researchers and students who are interested in nanoscale physical and biological systems and their applications in medicine.
- To introduce the concepts in nanomaterials and their use with biocomponents to synthesize and interact with larger systems.
- To impart knowledge on the most recent molecular diagnostic and therapeutic tools used to treat various diseases.

Course outcomes (CO)

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

CO1[K1]: relate to the essential features of biology and nanotechnology that are converging to create the new area of bionanotechnology.

CO2[K2]: explain the synthesis of nanomaterials and their applications.

CO3[K3]: apply the knowledge gained to develop nanomaterials.

CO4[K4]: compare the advantages and disadvantages of nanoparticles in health, medicine and environment.

CO5[K5]: Construct various types of nanomaterial for application and evaluate the impact on environment.

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K1]	3	3	3	1	2	2	2
CO2[K2]	3	2	3	2	2	3	3
CO3[K3]	3	2	3	2	2	3	3

CO4[K4]	2	2	2	2	2	2	3
CO5[K5]	2	2	2	2	2	2	2
Weightage of the course	13	12	13	9	10	12	13
Weighted percentage of Course contribution to POs	**2.35**	**2.39**	**3.26**	**1.14**	**2.71**	**3.48**	**3.55**

Based on the level of contribution ('3'-High, '2'-Medium, '1'-Low '-' No Correlation)

UNIT I **(12 hrs)**

Introduction to Nanotechnology - History, Concepts, Prospects and Challenges. Scope of nanotechnology in Indian and global perspectives. Definition - Nanoscience, Nanotechnology. Classification based on the dimensionality- basic understanding of 1D, 2D and 3D nanostructures. Overview of nanoparticles, nanoclusters - nanotubes, nanowires and nanodots. Biotemplates – DNA to build nanocubes and hinges – smart glue, DNA as wire template.

UNIT II **(12 hrs)**

Synthesis of Nanoparticles-Synthesis of nanoparticles - Top down and bottom up approach. Methods of synthesis: Physical, Chemical reduction – reducing agents, capping agents, stabilizing of nanoparticles and Biological – Novel synthetic methods using plant extracts, bacteria and fungi.

UNIT III **(12 hrs)**

Forest Utilization and Wood Technology- Properties & Characterization of Nanoparticles**-** Nano size effects - optical, electrical, mechanical, magnetic and catalytic activity. Characterization of nanoparticles using UV-Visible spectroscopy, SEM, TEM, Atomic force microscopy, Scanning tunnel microscopy, NMR, X-ray Crystallography and Photoluminescence.

UNIT IV **(12 hrs)**

Nanocarriers**-**Introduction. Nanocarriers for drug delivery (DDS) – Polimeric nanotubes and solid lipid nanoparticles (SLN) as carriers, controlled release, site specific targeting. Magnetic nanoparticles as drug carriers and its applications.

UNIT V **(12 hrs)**

Applications of Nanoparticles- Textiles, Food industry - nutraceutical, Medicine - antimicrobial activity, wound healing and dressing; Environment – green manufacturing. Agriculture - nanofertilizers and nanopesticides. Smart biosensors – Components and its application.

TEXTBOOKS

1. Charles., P. Poole., Jr. Frank J. Owens. *Introduction to Nanotechnology*. A John Wiley & Sons, INC., Publication, 2003.
2. George, K. Knopf., Amarjeet S., Bassi. *Smart Biosensors*. CRC Press, 2006.
3. Sulabha, K. Kulkarni. *Nanotechnology: Principles and Practices*. Capital, 2007.
4. Viswanathan B. *Nano Materials*. Narosa Publishing House, New Delhi, 2009.

REFERNCES

Books

1. Claudio Nicolini. *Nanotechnology Nanosciences*. Pon Stanford Pub.Pvt.Ltd, 2009.
2. Murty, B.S., Shankar, P., Raj, B., Rath, B.B., Murday, J. *Textbook of Nanoscience and Nanotechnology.* Spirnger Publication, 2013.
3. Prashant Kesharwani. *Nanotechnology-Based Targeted Drug Delivery Systems for Lung Cancer*. Academic Press. An imprint of Elsevier, 2019.

Web Sources

1. https://onlinelibrary.wiley.com/doi/book/10.1002/3527602453
2. https://www.elsevier.com/books/nanobiotechnology/ghosh/978-0-12-822878-4
3. https://www.routledge.com/Nanobiotechnology-Concepts-and-Applications-in-Health-Agriculture-and/Tomar-Jyoti-Kaushik/p/book/9781774635179
4. https://www.nanowerk.com/nanotechnology/periodicals/ebook_a.php
5. https://phys.org/news/2014-10-endless-possibilities-bio-nanotechnology.html
6. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC419715/
7. https://phys.org/news/2014-10-endless-possibilities-bio-nanotechnology.html

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF BOTANY
UG Programme - B.Sc. Botany
SEMESTER – VI
ELECTIVE COURSE GENERIC/ DISCIPLINE SPECIFIC - IX: COMPUTER APPLICATIONS IN BOTANY (23UBYO65)
(From 2023-2024 Batch onwards)

HOURS/WEEK: 4(L-2, T-1) **INT.MARKS: 25**
CREDITS : 3 **EXT. MARKS: 75**
DURATION : 60 hrs **MAX.MARKS:100**

Course Objectives

- To familiarize the student with the fundamentals concepts of bioinformatics.
- To equip students with computational skills for drug design.
- To learn about the bioinformatics database, data format and data retrieval from online sources.
- To develop interdisciplinary skills in using computers in botany to learn about the biological database.
- Student is aware with the most recent technologies for sequencing and bioinformatics analysis and is able to apply them to the structural and functional genomics of plants.

Course outcomes (CO)

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

CO1[K1]: recognize advanced resources for accessing scholarly literature from the internet.

CO2[K2]: explain the concept of databases and use of different public domain for DNA and proteins sequence retrieval.

CO3[K3]: apply various software resources with advanced functions to carry out analysis of data procured through research.

CO4[K4]:decipher the effective utilization of bibliography management software while typing and downloading citations.

CO5[K5]: determine how the knowledge gained can be used for designing experiments and data interpretation.

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K1]	3	3	3	1	2	2	2
CO2[K2]	3	2	3	2	2	3	3

CO3[K3]	2	2	3	2	2	3	3
CO4[K4]	2	2	2	2	2	2	3
CO5[K5]	3	3	2	2	2	2	2
Weightage of the course	13	12	13	9	10	12	13
Weighted percentage of Course contribution to POs	**2.35**	**2.39**	**3.26**	**1.14**	**2.71**	**3.48**	**3.55**

Based on the level of contribution ('3'-High, '2'-Medium, '1'-Low '-' No Correlation)

UNIT I **(12 hrs)**

Introduction to computers and Bioinformatics. Introduction to Computers – classification, computer generation, low, medium and high level languages, software and hardware, operating systems personal, mini, main frame and super computers, characteristics and application, computer memory and its types, data representation and storage. Microsoft excel, data entry, graphs, aggregate functions, formulas and functions, number systems, conversion devices, secondary storage media

UNIT II **(12 hrs)**

Biological Research on the web: Using search engines, finding scientific articles. Fundamentals of networking, internet, intranet, search engines- yahoo, Google, etc. telnet, ftp

UNIT III **(12 hrs)**

Computer fundamentals - programming languages in bioinformatics, role of supercomputers in biology. Historical background. Scope of bioinformatics - Genomics, Transcriptomics, Proteomics, Metabolomics, Molecular Phylogeny, computer aided Drug Design (structure based and ligand based approaches), Systems Biology and Functional Biology. Applications and Limitations of bioinformatics.

UNIT IV **(12 hrs)**

Introduction to databases. Biological databases- NCBI, EMBL and DDBJ. Data Generation and Data Retrieval Generation of data (Gene sequencing, Protein sequencing, Mass spectrometry, Microarray), Sequence submission tools (BankIt, Sequin, Webin); Sequence file format (flat file, FASTA, GCG, EMBL, Clustal, Phylip, Swiss-Prot); Sequence annotation; Data retrieval systems (SRS, Entrez) DNA sequencing methods. protein sequencing Phylogenetic analysis Similarity, identity and homology, Alignment – local and global alignment, pairwise and multiple sequence alignments, alignment algorithms. Methods of Alignment (Dot matrix, Dynamic Programming, BLAST and FASTA); Phylogenetic analysis: Construction of phylogenetic tree, dendrograms, methods of construction of phylogenetic trees.

UNIT V **(12 hrs)**

Applications: Application of Taxonomic Software for preparation of Dichotomous Key. Phylogenetic analysis. Make line drawing of Plants for description. Usage of plant identification apps on android phones. Computer application in biostatistics - MS Excel and SPSS.Computer Aided Designing (CAD) for outdoor and indoor Land scaping. Exposure to CAD (Computer Aided Designing).

TEXTBOOKS

1. Ghosh, Z., Mallick, B. *Bioinformatics – Principles and Applications*. 1st edition. New Delhi, Delhi: Oxford University Press, 2008.
2. Roy, D. *Bioinformatics, 1st edition*. Narosa Publishing House, 2009.
3. Pevsner J. *Bioinformatics and Functional Genomics, 2nd edition*. New Jersey, U.S. Wiley Blackwell. 2009.
4. P.K. Gupta. *Biotechnology and Henomics*. Rastogi Publications, 2017.

REFERNCES

Books

1. Gibas, C., Jambeck, P. *Developing Bioinformatics Skills*. O'Reilly Shroff Publishers and Distributors Pvt, Ltd., New York, US, 1999.
2. David W. Mount. *Bioinformatics Sequence and Genome Analysis*. 2nd Edition, Cold Spring Harbor Laboratory Press, New York, US, 2004.
3. Harshitha, D. *Techniques of Teaching Computer Science,* International Book Distributor, Dehradun, 2006.
4. Chwan-Hwa. *Computer networks and cyber security*. CRC Press, 2016.
5. Ron Wehrens., Reza Salek. *Metabolomics: Practical Guide to Design and Analysis*. Chapman and Hall/CRC; 1st edition, 2019.

Web Sources

1. http://www.agrimoon.com/introduction-to-computer-applications-pdf-book/
2. https://www.ebooks.com/en-us/subjects/computers/
3. https://it.careers360.com/download/ebooks
4. http://www.aun.edu.eg/molecular_biology/Procedure%20Bioinformatics22.23-4-2015/Xiong%20-%20Essential%20Bioinformatics%20send%20by%20Amira.pdf
5. http://www.freebookcentre.net/Biology/BioInformatics-Books.html
6. https://courses.cs.ut.ee/MTAT.03.242/2017_fall/uploads/Main/Basics_of_Bioinformatics.pdf

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF BOTANY
UG Programme - B.Sc. Botany
SEMESTER – VI
ELECTIVE COURSE GENERIC/ DISCIPLINE SPECIFIC - IX: FORENSIC BOTANY
(23UBYO66)
(From 2023-2024 Batch onwards)

HOURS/WEEK: 4(L-3, T-1) **INT.MARKS: 25**
CREDITS : 3 **EXT. MARKS: 75**
DURATION : 60 hrs **MAX.MARKS:100**

Course Objectives

- The provide basic knowledge about the application of Botany to Forensic investigations and legal disputes.
- To provide students with knowledge of palynology, dendrology, plant anatomy, pharmacognosy, molecular biology and toxic compounds from plants that could serve as leads in crime spots.
- To learn classification of plants from forensic point of view.
- To understand forensic importance of different parts of plants.
- To develop and identify main morphological and anatomical features of plants, which could be useful for forensic investigations.

Course outcomes (CO)

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

CO1[K1]: recognize morphological and anatomical features of plants, which could be useful for forensic investigations.

CO2[K2]: summarize the forensic importance of different parts of plants.

CO3[K3]: apply techniques for the collection and preserve of botanical evidences of crime

CO4[K4]: analyze and decipher the significance of classic and DNA based forensic botany cases

CO5[K5]:interpret and deduce new methods for the detection of plant poisons used in crime.

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K1]	3	3	3	1	2	2	2
CO2[K2]	3	2	3	2	2	3	3

CO3[K3]	2	2	3	2	2	3	3
CO4[K4]	2	2	2	2	2	2	3
CO5[K5]	3	3	2	2	2	2	2
Weightage of the course	13	12	13	9	10	12	13
Weighted percentage of Course contribution to POs	**2.35**	**2.39**	**3.26**	**1.14**	**2.71**	**3.48**	**3.55**

Based on the level of contribution ('3'-High, '2'-Medium, '1'-Low '-' No Correlation)

UNIT I **(12 hrs)**

General plant classification schemes, Sub specialization of forensic botany-plant morphology, plant anatomy, plant systematic, palynology, plant ecology, limnology, Plant architecture- roots, stems, flowers, leaves. Practical plant classification schemes: vegetables and herbs, fruits bearing trees and plants, landscaping plants: trees, shrubs and vines, grasses, plant cell structure and functions.

UNIT II **(12 hrs)**

Various types of woods, timbers, seeds and leaves and their forensic importance, Identification and matching of various types of wood, timber varieties, seeds and leaves. Types of fibers – forensic aspects of fiber examinations, Identification and comparison of man–made and natural fibres. Various types of planktons and diatoms and their forensic importance. Study and identification of pollen grains, Identification of starch grains, powder and stains of spices etc. Paper and Paper Pulp identification.

UNIT III **(12 hrs)**

Various types of poisonous plants: *Abrus precatorius*, *Aconitum napellus*, *Anacardium occidentale*, *Argemone mexicana*, *Cannabis sativa*, *Claviceps purpuria*, *Croton tiglium*, *Atropa belladonna*, *Gloriosa superba*, *Jatropha curcas*, *Lathyrus sativus*, *Nerium indicum*, *Nicotiana tabacum*, *Strychnos nux vomica*, *Thevetia nerifolia*. Types of plants yielding drugs of abuse – opium, cannabis, coco, tobacco, datura, *Psilocybin* mushrooms.

UNIT IV **(12 hrs)**

Collection and preservation of botanical evidences: Botanical samples, outdoor crime scene consideration.

UNIT V **(12 hrs)**

Analysis of samples, DNA analysis, plant DNA typing, Classic forensic botany cases: Case histories by using Plant anatomy and systematic, Palynology, Plant ecology, Limnology, Plant Molecular Biology and DNA, Drug enforcement and DNA.

TEXTBOOKS

1. Coyle, H.M. *Forensic Botany: Principles and Applications to Criminal Casework*. CRC Press, 2005.
2. James, S.H., Nordby J.J., Bell, S. *Forensic Science: An Introduction to Scientific and Investigative Techniques*. CRC Press, 2015.
3. Jane H Bock., David Norris. *Forensic Plant Science*. Elesvier, 2015.

REFERNCES

Books

1. Hall, D.W., Byrd, J. *Forensic Botany: a practical guide*. *Wiley-Blackwell*,
2. Nicholas Marquez Grant., John Wiley. *Forensic Ecology Handbook*. Wiley Backwell, 2012.
3. David W. Hall, Jason Byrd. *Forensic Botany.* A Practical Guide. Wiley-Blackwell, 2012.

Web Sources

1. https://www.kobo.com/us/en/ebook/forensic-botany
2. https://www.worldcat.org/title/forensic-botany-a-practical-guide/oclc/796086574
3. https://www.buecher.de/shop/pflanzenoekologie/forensic-botany-ebook-pdf/hall-david-w--byrd-jason/products_products/detail/prod_id/37354547/
4. https://www.crcpress.com/Forensic-Botany-Principles-and-Applications-to-Criminal-Casework/Miller-Coyle/p/book/9780849315299
5. http://docshare02.docshare.tips/files/25818/258183613.pdf

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI

DEPARTMENT OF BOTANY

UG Programme - B.Sc. Botany

SEMESTER – VI

SKILL ENHANCEMENT COURSE – IX: PROFESSIONAL COMPETENCY COURSE: BOTANY FOR COMPETITIVE EXAMINATION (23UBYS61)

(From 2023-2024 Batch onwards)

HOURS/WEEK: 2 **INT.MARKS: 25**

CREDITS : 2 **EXT. MARKS: 75**

DURATION : 30 hrs **MAX.MARKS:100**

Course Objectives

- To compare different groups of plants and evaluate their economic importance
- To describe the general characters of higher plants.
- To design eco friendly approaches to protect earth and generate new conservation
- To give knowledge on the different cell organelles with their functions.
- To Identify the cause and solve environmental related issues .

Course outcomes (CO)

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

CO1[K1]: identify and define different groups of plants with their taxonomic position Compare the different groups of plants and evaluate their economic importance

CO2[K2]: describe the general characters of Bryophytes, Pteridophytes and Gymnosperms

CO3[K3]: analyse different modifications of plant organs.

CO4[K4]: evaluate the significance of cell division. Justify the cause for the sex linked inheritance

CO5[K5]: elaborate the cause and solution of environmental issues

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K1]	3	2	3	1	1	2	2
CO2[K2]	3	2	3	1	1	2	2
CO3[K3]	2	1	3	1	1	1	2
CO4[K4]	2	1	2	1	1	1	2
CO5[K5]	2	1	2	3	2	2	2

Weightage of the course	12	7	13	6	6	8	10
Weighted percentage of Course contribution to POs	**2.17**	**1.39**	**3.26**	**1.37**	**2.03**	**2.79**	**3.23**

Based on the level of contribution ('3'-High, '2'-Medium, '1'-Low '-' No Correlation)

UNIT I **(6 hrs)**

Plant World- Plant science and its branches . Five kingdom classification. Outline of Kingdom plantae General characters and Economic importance of Algae, Fungi and Lichens.

UNIT II **(6 hrs)**

General Characters of Plant Groups-General characters and Economic importance of Bryophytes, Pteridophytes and Gymnosperms .Palaeobotany- Types of fossils, Geological time scale ,Fossil beds of Tamil Nadu.

UNIT III **(6 hrs)**

Plant Morphology and Taxonomy-Root system and shoot system. Modifications (Pneumatophore, Stilt root, Epiphytic root, Cladode, Phylloclade ,Pitcher and Phyllode) Parts of a flower - Fruits types(Outline) Parthenocarpy-Pollination – types, Seed dispersal – types, Seed Germination types. Taxonomy – definition. Types of classification- Taxonomic hierarchy, ICN, Binomial nomenclature and BSI. Herbarium and Major Herbaria of the world.

UNIT IV **(6 hrs)**

Cytology and Genetics- Cell –Prokaryotic and Eukaryotic – Cell organelles with functions . DNA and RNA (Basic concepts) -Cell division and its significance - Mitosis and Meiosis (outline) Mendelism – Monohybrid and Dihybrid cross, Sex linked inheritance.

UNIT V **(6 hrs)**

Ecology and Biodiversity- Ecosystem – abiotic and biotic components. Energy flow in an ecosystem, Aforestation, Deforestation- Chipko movement –-Forest Conservation act- Pollution types and effects- Eutrophication, Global warming ,Ozone depletion, Climate change.

Biodiversity and types- Hot spots, Mega diversity countries, Conservation – *ex situ* and *in situ* methods. Endangered plants and Red data Book. Rio -Earth summit. Biodiversity Management Policies - IUCN, UNEP, WWF, ICSU, WCMC.

TEXTBOOKS

1. Morris, P., Therivel, R. *Methods of Environmental Impact Assessment*. UCL Press, London, 1995.
2. Therivel, R. and Partidario, M.R. *The Practice of Strategic Environmental Assessment,* Earthscan, London, 1996.
3. Rau, J.G., Wooten, D.C. *Environmental Impact Assessment*. McGraw Hill Pub. Co., New York, 1996.
4. . Petts, J. 1999. Handbook of Environmental Impact Assessment, volume 1 and 2, Blackwell Science, Oxford.

REFERNCES

Books

1. Jain, R.K., Urban, L.V., Stracy, G.S. *Environmental Impact Analysis.* Van Nostrand Reinhold Co., New York, 1991.
2. Petts, J. *Handbook of Environmental Impact Assessment- Volume 1 and 2.* Blackwell Publishers, UK. 2005.
3. Kulkarni, V. and Ramachandra, T.V. *Environmental Management*, Capital Pub. Co. New Delhi,2006.
4. Glasson, J. Therivel., R. and Chadwick. *A. Introduction to Environmental Impact Assessment*. Routledge, London. 2006.

Web Sources

1. https://www.amazon.in/Environmental-Impact-Assessment-Gajbhiye-Khandeshwar-ebook/dp/B06XTNQ5PW
2. https://www.ikbooks.com/books/book/earth-environmental-sciences/environmental-impact-assessment/9789382332930/
3. https://www.elsevier.com/books/environmental-impact-assessment/mareddy/978-0-12-811139-0
4. https://link.springer.com/book/10.1007/978-3-030-80942
5. https://onlinelibrary.wiley.com/doi/book/10.1002/0471722022

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF BOTANY
UG Programme - B.Sc. Botany
SEMESTER – VI
SKILL ENHANCEMENT COURSE – XI: GENERAL STUDIES FOR COMPETITIVE EXAMINATION (23UBYS62)
(From 2023-2024 Batch onwards)

HOURS/WEEK: 2 **INT.MARKS: 25**
CREDITS : 2 **EXT. MARKS:75**
DURATION : 30 hrs **MAX.MARKS:100**

Course Objectives

- To familiar with the history of world.
- To familiar with the awards and honours given by government.
- To study about the Indian economy.
- To increase knowledge on Indian Polity.

Course outcomes (CO)

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

CO1[K1]: choose eco-friendly approaches to protect earth and generate new conservation strategies.
CO2[K2]: explain about physical geography of India
CO3[K3]: elucidate the Indian and world history
CO4[K4]: comment on international organisation
CO5[K5]: develop solution for environmental issues

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K1]	3	2	3	1	1	2	2
CO 2[K2]	3	2	3	1	1	2	2
CO 3[K3]	2	1	3	1	1	1	2
CO 4[K4]	2	1	2	1	1	1	2
CO 5[K5]	2	1	2	3	2	2	2
Weightage of the course	12	7	13	6	6	8	10
Weighted percentage of Course contribution to POs	**2.17**	**1.39**	**3.26**	**1.37**	**2.03**	**2.79**	**3.23**

Based on the level of contribution ('3'-High, '2'-Medium, '1'-Low '-' No Correlation)

Physical Geography
Indian and World Geography
Indian and World History
International Organizations
Everyday Science
Awards and Honors
Indian Economy
Indian Polity

TEXTBOOKS

1. Mitra, S. *Botany for competitive examinations*. Academic Publishers, 2016.
2. Sharma, P.D. . *Ecology and Environment*. Rastogi Publication, Meerut, 2017.

REFERRENCES

Books

1. Pullaiah, T & D, Varalakshmi Narayana, P, Suresh. *Botany for Competitive Examinations*. 2021.

Web Sources

1. https://www.amazon.in/BOTANY-COMPETITIVE-EXAMINATIONS-SUNIT-MITRA/dp/9383420898
2. .https://www.amazon.in/Botany-Competitive-Examinations-UPSC-Indian-Competive/dp/B08VWB64BChttps://www.ssclatestnews.com/botany-book-pdf-free-download-for-competitive-exams/
3. https://www.ssclatestnews.com/botany-book-pdf-free-download-for-competitive-exams/

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF BOTANY
UG Programme - B.Sc. Botany
SEMESTER – VI
SKILL ENHANCEMENT COURSE - IX: BOTANY FOR ADVANCED STUDIES
(23UBYS63)
(From 2023-2024 onwards)

HOURS/WEEK: 2 **INT.MARKS: 25**
CREDITS : 2 **EXT. MARKS: 75**
DURATION : 30 hrs **MAX.MARKS:100**

Course Objectives

- To understand the basic concepts of plant systematic and production system and various techniques used in molecular studies.
- To understand the concepts of nomenclature and evolutionary pattern.
- To understand the concepts of growth and metabolism of plants.
- To give an overview of Nuclear genome.
- To differentiate monocot and dicot.

Course outcomes (CO)

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

CO1[K1]: describe the basic principles of systematics, including identification, nomenclature, classification, and the inference of evolutionary patterns from data

CO2[K2]: explain the structures, functions and roles of apical *vs* lateral meristems in monocot and dicot plant growth

CO3[K3]: construct the organization of nuclear genome

CO4[K4]: analyze the various steps involved in the basic functioning of plant growth and the nutritive value of food

CO5[K5]: conclude the various processes involved in the energy production in plants and metabolic pathways

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K1]	3	2	3	1	1	2	2
CO2[K2]	3	2	3	1	1	2	2
CO3[K3]	2	1	3	1	1	1	2
CO4[K4]	2	1	2	1	1	1	2

CO5[K5]	2	1	2	3	2	2	2
Weightage of the course	12	7	13	6	6	8	10
Weighted percentage of Course contribution to POs	**2.17**	**1.39**	**3.26**	**1.37**	**2.03**	**2.79**	**3.23**

Based on the level of contribution ('3'-High, '2'-Medium, '1'-Low '-' No Correlation)

UNIT I **(6 hrs)**

MOLECULAR GENETICS

Molecular Biology of gene expression: Brief overview of the Central Dogma and Teminism. Transcription in prokaryotes and eukaryotes. Types and structure of RNA polymerase, Different types of RNA, Regulatory sequences and transcription factors involved. Mechanism: Initiation, elongation and termination. Split genes and RNA splicing in eukaryotes. Translation in prokaryotes and eukaryotes. Salient features, exceptions, tRNA-suppressor mutations. Mechanism of translation: Chain initiation, elongation and termination, proteins involved, factors affecting translation accuracy. Molecular mechanism of mutation, cancer biology, human cytogentics

Molecular mechanism of Gene Regulation: Regulation in prokaryotes, Regulation in Eukaryotes, Epigenetic mechanisms: methylation and transcriptional inactivation, cosuppression through transcriptional silencing, genome imprinting. RNA processing->alternative splicing, RNA stability, RNA interference. Translational regulation: Gene amplification, mating type interconversion.

Genomics: Structural genomics, Genetic and physical mapping (RFLP), microsatellite maps, cyotogenetic maps, physical maps, positional cloning, chromosome walks and jumps, Genome sequencing, genome databases, human genome sequencing project. Functional genomics. transcriptome, proteome and metabolome, Microarrays and gene-chips. Comparative genomics. Functional and evolutionary relationships prokaryotes, organelles and eukaryotes, orthologues and paralogues. Metabolomics: Identification and quantification of cellular metabolites in biological samples. Pharmacogenomics and drug designing.

UNIT II **(6 hrs)**

Advanced Trends in Systematics

Basic Concepts Of**:**

a. Morphology - History, general morphology, types of data, methods of gathering data,

b. Anatomy - History, general anatomy, types of data, methods of gathering data,

c. Embryology – History, types of data, methods of gathering data;

d. Palynology: History, general palynological characters, types of data, methods of gathering data;

e. Cytology and Cytogenetics: History, general cytological and cytogenetic characters, types of data, methods of gathering data;

f. Ecology, History, general ecology, types of data, methods of gathering data

(At least two examples from each section should be studied to substantiate the taxonomic significance)

Chemotaxonomy:

a. History, general chemical and chemotaxonomic characters, types of data, methods of gathering data.

b. Identification of the major classes of the pharmaceutically important secondary metabolites from natural sources 8 (phenolics, steroids, terpenoids glycosides and alkaloids).

c. Applications: Phytochemicals in cosmetics, aromatherapy, disease prevention, biotechnology in the production of phytochemicals. Phytochemical databases

(iii) Molecular trends in Biosystematics

a. Molecules and genomes in plant systematics, techniques used in molecular taxonomy, molecular systematics in crop evolution

b. Serology in relation to plant taxonomy- Methods, role of serology in taxonomy.

c. Cladistics and Phenetics (iv) Molecular trends in Reproductive Biology: (i) Apomixis – Types, cytogenetic basis and induction of apomixes, applications. Biochemistry and genetics of incompatibility, methods to overcome incompatibility, pollen viability tests, molecular basis of incompatibility.Sterility – Male sterility, CMS, GMS, CGMS, temperature sensitive and photosensitive male sterility, transgenic male sterility, female sterility and zygotic sterility.

UNIT III **(6 hrs)**

Plant Physiology: Modern concepts Photosynthesis – Environmental and agricultural relevance; Respiration – Biochemical control of respiration.Photomorphogenesis Phytochrome genes and their expression, control of photo-morphogenic responses. Dose-response relations in photomorphogenesis, light induced chloroplast differentiation, effect of photoreceptors. Biological clock: Circadian rhythms, rhythm responses to environment, clock mechanism

Photoperiodism General principles , florigen concept .Plant growth and development Patterns of growth and differentiation; Gene expression and mutations regulating meristem function, embryogenesis, seedling, root, leaf and flower development. Homeotic genes, ABCD model in Arabidopsis flower, hormonal control of plant tissue development, effect of auxins on root and root formation, gibberellin promoted growth of plants, ethylene and triple response mutants, brassinosteroids and photomorphogenesis.

UNIT IV **(6 hrs)**

Plant Physiology-Enzymes: General account: Importance and properties of enzymes in biological sciences, the classification and nomenclature of enzymes with examples, Mechanism of enzyme action role of enzyme in chemical action, various factors affecting the enzyme activity.Molecular genetics in plant physiology, Environmental plant physiology, Stress physiology .

UNIT V **(6 hrs)**

Economc Botany **-** Economic importance of Cereals, Tuber Crops, Fibre yielding plants, Plantation Crops, Sugar yielding plants, Narcotics, Vegetables, Oil yielding plants, Pulses and Beverages

TEXTBOOKS

1. Maheshwari, P. *Recent Advances in Embryology of Angiosperms.* Intl. Soc. Plant Morphologists, New Delhi,1963
2. Sharma, O.P. *Plant Taxonomy*.The McGraw Hill Companies. 2017.
3. Sharma, P.C. *Text Book of Plant Anatomy*. Arjun Publishing House, New Delhi, 2017.
4. Jain, V.K. *Plant Physiology*. S.Chand & Company Ltd. New Delhi, 2017.

REFERENCES

Books

1. Mabberley, J.D. *Mebberley's Plant-Book: A portable dictionary of plants, their classification and uses*. Cambridge University Press, Cambridge, U.K, 2014.
2. Bhojwani, S.S. and Soh, W.Y. *Current trends in the embryology of angiosperms.* Springer Science & Business Media, Germany, 2013.
3. Steward, F.C. *Plant Physiology.* Academic Press, US, 2012.

Web Source

1. http:// www.ornl.gov.
2. http:// ash. gene. ncl. ac .nk..
3. http://tor. cshl. org. http:www. gdb. org.
4. http: //www. neg r. org.
5. http: // www. genetics. wustl. edu.
6. http: // genome. imb- jena. dc.

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF BOTANY
UG Programme
SEMESTER V & VI
PART V – EXTENSION ACTIVITY
(From 2023 -2024 Batch Onwards)

HOURS/WEEK: -
CREDIT : 1
DURATION : **INT. MARKS: 100**

Course Objectives

- To promote community involvement, encourage civic participation, and foster a sense of ownership and responsibility.
- To involve the learners in organizing campaigns, seminars, or public events to educate the public, promote understanding, and advocate for positive change.
- To create platforms for knowledge sharing, partnership development, and collective action.
- To encourage environmental conservation, promote responsible resource management, or foster sustainable livelihoods.
- To raise awareness about social issues, advocate for marginalized groups, or implement programs that promote inclusivity and equal opportunities.

Course Outcomes (CO)

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

CO1 [K1]: recognize the importance of community service through training and education

CO2 [K2]: interpret ecological concerns, consumer rights, gender issues & legal protection

CO3 [K3]: develop team spirit, verbal/nonverbal communication and organizational ethics by participating in community service

CO4 [K4]: examine the necessity of professional skills & community-oriented services for a holistic development

CO5 [K6]: create awareness on human rights, legal rights, First Aid, Physical fitness and wellbeing

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1 [K1]	2	-	-	2	2	1	1
CO2 [K2]	2	1	-	2	1	1	1
CO3 [K3]	2	-	-	1	2	2	1
CO4 [K4]	1	1	1	1	2	2	1

CO5 [K6]	1	-	-	1	2	2	1
Weightage of the course	08	02	01	07	09	08	05
Weighted percentage of Course contribution to Pos	**1.45**	**0.4**	**0.25**	**1.6**	**3.05**	**2.79**	**1.61**

Based on the level of contribution ('3'-High, '2'-Medium, '1'-Low '-' No Correlation)

Details of the Courses

1 National Cadet Corps (NCC) – 190 hrs
2 National Service Scheme (NSS) – 240 hrs
3 Physical Education
4 Red Ribbon Club (RRC)
5 Youth Red Cross (YRC)
6 Fine Arts Club
7 Library and Information Service Club
8 Yoga Club
9 ECO Club
10 Consumer Club
11 Human Rights Club
12 Women Empowerment Cell
13 Legal Awareness League