



CHRIST COLLEGE (AUTONOMOUS), IRINJALAKUDA

BOTANICAL DIVERSITY

Programme	B. Sc.				
Course Title	Plant Morphology, Physiology & Plant Resources				
Type of Course	Minor				
Semester	II				
Academic Level	100-199				
Course Details	Credit	Lecture per week	Tutorial per week	Practical per week	Total Hours
	4	3	-	2	75
Pre-requisites	Higher secondary level Biology course				
Course Summary	This course covers a comprehensive study of the structure, function, and utilization of plants. Students will explore the morphology of plants, and the physiological processes that occur within plants. Furthermore, students will learn about the diverse uses of plants as valuable resources for food, medicine, and more.				

Course Outcomes (CO): After completing the Course, the student should be able to:-

CO	CO Statement	Cognitive Level*	Knowledge Category#	Evaluation Tools
CO1	Explain the various morphological characteristics of a plant	U	F	Quiz/ Test/Assignments/ Practical/ Field studies
CO2	Explain the physiological processes that drive plant growth, development and responses to the environment	U	F&C	Assignments/Quiz/Test
CO3	Discuss the process of growth in plants	U	C	Presentations
CO4	Explain the importance of plants as valuable resources for food, medicine and more	U	C	Group project/Class discussion
CO5	Apply knowledge of plant morphology and physiology to analyze problems related to plant health and productivity	Ap	C&P	Field work/practicals

* - Remember (R), Understand (U), Apply (Ap), Analyse (An), Evaluate (E), Create (C)

- Factual Knowledge(F) Conceptual Knowledge (C) Procedural Knowledge (P) Metacognitive Knowledge (M)

Detailed Syllabus:

Module	Unit	Content	Hrs (45 + 30)
I	Plant Morphology		7
	1	Morphology of leaf; Structure, simple, compound, venation and phyllotaxy.	2
	2	Inflorescence - Racemose, cymose, special, types with examples	2
	3	Flower - as a modified shoot, structure of flower, symmetry of flower, floral parts - their arrangement, types of aestivation, relative position of parts, cohesion and adhesion of stamens and placentation.	3
II	Plant Physiology		18
	4	Water relations: Permeability, Imbibition, Diffusion, Osmosis and water potential.	2
	5	Absorption of water: passive mechanism.	1
	6	Ascent of sap: Transpiration pull or cohesion-tension theory.	2
	7	Transpiration: Types, mechanism of stomatal movement: K ⁺ ion theory.	2
	8	Significance of transpiration, antitranspirants.	2
	9	Photosynthesis: Introduction, significance, Two pigment systems, red drop, Emerson enhancement effect, action and absorption spectra.	3
	10	Mechanism of photosynthesis: Light reaction, cyclic & non-cyclic photo phosphorylation, Dark reactions-Calvin cycle, C ₄ cycle, photorespiration (a brief account only). Factors affecting photosynthesis.	6
III	Plant Growth		10
	11	Plant growth - Definition, phases of growth, Auxins, gibberellins, cytokinin, abscisic acid and ethylene, their physiological roles.	2
	12	Senescence and abscission.	2
	13	Photo-periodism and vernalization.	2
	14	Dormancy of seeds - Factors causing dormancy, photoblasticism, techniques to break dormancy.	2
	15	Physiology of fruit ripening.	2
IV	Plant Resources		10
	16	Brief account on the various categories of plants based on their economic importance	1
	17	Study the following plants with special reference to their binomial, family, morphology of the useful part and their uses. Cereals: Paddy, Wheat; Pulses: Black gram, Green gram; Oil: Coconut, Gingelly	3

	18	Fibre: Cotton; Latex: Rubber; Beverages: Tea, Coffee	2
	19	Spices: Pepper, Cardamom, Clove	2
	20	Medicinal plants: <i>Rauwolfia serpentina</i> , <i>Justicia adhatoda</i> , <i>Santalum album</i> and <i>Curcuma longa</i> .	2
V	Practical (Mandatory experiments)		30
	<p>4. Identify the types of inflorescences mentioned in the syllabus.</p> <p>5. Learn the principle and working of the following apparatus/experiments</p> <ul style="list-style-type: none"> ▪ Thistle funnel osmoscope ▪ Ganong's potometer ▪ Ganong's light-screen ▪ Absorbo transpirometer ▪ Mohl's half-leaf experiment ▪ Experiment to show evolution of O₂ during photosynthesis <p>6. Identify at sight the economically important plant produces and products mentioned in module IV, and learn the binomial and family of the source plants, morphology of the useful parts and uses</p>		
Practical (Open ended)			
<ol style="list-style-type: none"> 1. Preparation of dried specimen or photo album of the morphological types studied 2. Setting up and understanding the working of any two physiological experiments and recording the result 3. Group project on the preparation of sample specimens of the economically important plants studied 			
Suggested Readings			
<ul style="list-style-type: none"> • Sporne K. R. 1974. Morphology of Angiosperms. Hutchinson. • William G. Hopkins. 1999. Introduction to Plant Physiology, 2nd edition, John Wiley & Sons, Inc. • Frank B. Salisbury and Cleon W. Ross. 2002. Plant Physiology 3rd edition. CBS publishers and distributors. • G. Ray Noggle and George J. Fritz. 1983. Introductory Plant Physiology Prentice Hall. • Pandey B. P. 1987. Economic Botany • Verma V. 1984. Economic Botany • Hill A.W. 1981. Economic Botany, McGraw Hill Pub • Alam, Afroz. 2020. A Textbook of Economic Botany and Ethnobotany. IK International Publishing House. • Atal C.K. and Kapur B. M. 1982. Cultivation and Utilization of Medicinal Plants. CSIR-RRL, Jammu. • Sambamurty and Subrahmanyam, N. S. 2008. A Textbook of Modern Economic Botany. CBS Publishers & Distributors Pvt. Ltd. • Bhutya, R. K. 2021. Medicinal Plants of India Vol. I & II. Scientific Publishers. 			

Mapping of COs with POs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	2	-	1	-	3	1	1
CO2	2	-	1	1	3	1	2
CO3	2	-	2	1	3	1	2
CO4	2	-	2	-	2	1	1
CO5	2	-	2	1	3	1	2

Correlation Levels:

Level	Correlation
-	Nil
1	Slightly / Low
2	Moderate / Medium
3	Substantial / High

Assessment Rubrics:

- Quiz / Discussion
- Assignment/ Seminar
- Project/Practical
- Final Exam

Mapping of COs to Assessment Rubrics :

	Internal Exam	Assignment/Seminar	Practical/Project Evaluation	End Semester Examinations
CO 1	✓	✓	✓	✓
CO 2	✓	✓	✓	✓
CO 3	✓	✓		✓
CO 4	✓	✓	✓	✓
CO 5	✓		✓	