

**UNIVERSITY OF MADRAS**  
**B.Sc. DEGREE PROGRAMME IN PLANT BIOLOGY**  
**AND PLANT BIOTECHNOLOGY**  
**SYLLABUS WITH EFFECT FROM 2023-2024**

**CORE IX PLANT MORPHOLOGY, TAXONOMY AND ECONOMIC BOTANY**

<b>Title of the Course</b>	<b>PLANT MORPHOLOGY, TAXONOMY AND ECONOMIC BOTANY</b>						
<b>Paper Number</b>	CORE IX						
<b>Category</b>	Core	<b>Year</b>	III	<b>Credits</b>	4	<b>CourseCode</b>	339C5A
		<b>Semester</b>	V				
<b>Instructional Hours</b>		<b>Lecture</b>		<b>Tutorial</b>		<b>Lab Practice</b>	<b>Total</b>
<b>per week</b>		3		1			4
<b>Pre-requisite</b>		Prior knowledge on morphological, anatomical characteristics and uses of plants.					
<b>Learning Objectives</b>							
<b>C1</b>	Students will have extensive knowledge of the morphology (vegetative structures and floral structures) of flowering plants.						
<b>C2</b>	Students will know about the basic concepts of classification of plants.						
<b>C3</b>	Understand major evolutionary trends in Angiospermic plants.						
<b>C4</b>	To know the characteristic features of the selected families.						
<b>C5</b>	To know the economic importance of plants.						
<b>Course outcomes:</b>	<b>Programme Outcomes</b>						
On completion of this course, the students will be able to:							
<b>CO</b>							
1. Define the concepts in plant morphology and rules of	K1						

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IUCN in botanical nomenclature.	
2. Classify systems of plant classification and recognize the importance of herbarium and virtual herbarium.	K2
3. Describe the core concepts of economic Botany and relate its applications in human life.	K3
4. Analyze the characters of the families according to the Bentham and Hooker's system of classification.	K4
5. Assess terms and concepts related to Phylogenetic Systematics.	K5
<b>UNIT</b>	<b>CONTENTS</b>
I	Morphology – root system – modifications. Shoot system – modifications – (Aerial, sub-aerial and underground). Leaf-Types-simple and compound, phyllotaxy. Leaf modifications - phyllode, pitcher, tendrils, spines. Inflorescences – definition and types – racemose, cymose, mixed and special types. Fruits - classification.

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<b>II</b>	History of Angiosperm classification – Artificial, Natural and Phylogenetic system of classification. An outline of Bentham 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, typification and author citation.
<b>III</b>	Study of the following families based on the Natural system and their economic importance: Anonaceae, Nymphaeaceae, Capparidaceae, Rutaceae, Caesalpinaceae, Cucurbitaceae, Asteraceae, Apocynaceae and Asclepiadaceae.
<b>IV</b>	Study of the following families based on the natural system and their economic importance: Convolvulaceae, Acanthaceae, Lamiaceae, Amaranthaceae, Euphorbiaceae, Liliaceae, Orchidaceae and Poaceae.
<b>V</b>	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 (Groundnut), spices (Cardamom), essential oil (Rose), natural rubber and timber plants (Teak) and Fibre (Cotton).

Extended Professional Component (is a part of internal component only, Not to be included in the External Examination question paper)	Questions related to the above topics, from various competitive examinations UPSC / TRB / NET / UGC – CSIR / GATE / TNPSC /others to be solved  (To be discussed during the Tutorial hour)
Skills acquired from this course	Knowledge, Problem Solving, Analytical ability, Professional Competency, Professional Communication and Transferrable Skill

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<p style="text-align: center;"><b>Recommended Texts</b></p>	<ol style="list-style-type: none"> <li>1. Lawrence, G.H.M. 1985. An Introduction to Plant Taxonomy, Central Book Depot, Allahabad.</li> <li>2. Porter, C.L. 1982. Taxonomy of Flowering Plants, Eurasia Publications House, New Delhi</li> <li>3. Solbrig, O.T. 1970. Principles and Methods of Plant Biosystematics. The MacMillan Co-collier-MacMillan Ltd., London.</li> <li>4. Solbrig, O.T and Solbrig, D.J. 1979. Population Biology and Evolution, Addison-Wesley Publishing Co. Ind USA.</li> <li>5. Takhtajan, A.L. 1997. Diversity and Classification of Flowering Plants. Columbia University Press, New York.</li> <li>6. Woodland, D.W. 1991. Contemporary Plant Systematics. Prentice Hall. New Jersey.</li> <li>7. Rajni Gupta. 2012. Plant Taxonomy: Past, Present and Future. <a href="#">Vedams (P) Ltd. New Delhi.</a></li> </ol>
<p style="text-align: center;"><b>Reference Books</b></p>	<ol style="list-style-type: none"> <li>1. Hutchinson, J. 1973. The Families of Flowering plants , Oxford University press, London.</li> <li>2. Gamble, J.S., Fisher, L.E.F.1967. The Flora of The presidency of Madras (Vol-III) BSI, Calcutta</li> <li>3. Davis, P.H and Heywood, V.M. 1965. Principles of Angiosperm Taxonomy, Oliver and Boyd Edinburgh.</li> <li>4. Clive AS.1989. Plant Taxonomy and Biosystematics, Chapman and Hall Inc. New York.</li> <li>5. Harborne, J.B and Turner, B.L. 1984. Plant Chemosystematics, Acad. Press, London.</li> <li>6. Lawrence, G.H. 1955. Taxonomy of Vascular Plants, MacMillan Co., USA.</li> <li>7. Jones, S.B. Jr. and Luchsinger, A.E. 1986. Plant Systematics (2nd edition). McGraw-Hill Book Co., New York.</li> </ol>
<p style="text-align: center;"><b>Web Resources</b></p>	<ol style="list-style-type: none"> <li>1. <a href="https://books.google.co.in/books/about/Plant_Taxonomy_2E.html?id=px_WAwHiZIC&amp;redirhttps://books.google.co.in/books/about/Plant_Taxonomy_and_Biosystematics.html?id=VfQnuwh3bw8C&amp;redir_esc=y_esc=y">https://books.google.co.in/books/about/Plant_Taxonomy_2E.html?id=px_WAwHiZIC&amp;redirhttps://books.google.co.in/books/about/Plant_Taxonomy_and_Biosystematics.html?id=VfQnuwh3bw8C&amp;redir_esc=y_esc=y</a></li> <li>2. <a href="https://books.google.co.in/books/about/PLANT_TAXONOMY_2E.html?id=RoI0lwSXFuUC&amp;redir_esc=y">https://books.google.co.in/books/about/PLANT_TAXONOMY_2E.html?id=RoI0lwSXFuUC&amp;redir_esc=y</a></li> <li>3. <a href="https://books.google.co.in/books/about/Plant_Taxonomy.html?id=0bYs8F0Mb9gC&amp;redir_esc=y">https://books.google.co.in/books/about/Plant_Taxonomy.html?id=0bYs8F0Mb9gC&amp;redir_esc=y</a></li> </ol>

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	4. <a href="https://books.google.co.in/books/about/Economic_Botany.html?id=2ahsDQAAQBAJ&amp;redir_esc=y">https://books.google.co.in/books/about/Economic_Botany.html?id=2ahsDQAAQBAJ&amp;redir_esc=y</a> 5. <a href="https://books.google.co.in/books/about/Textbook_Of_Economic_Botany.html?id=XmZFJO_JHv8C&amp;redir_esc=y">https://books.google.co.in/books/about/Textbook_Of_Economic_Botany.html?id=XmZFJO_JHv8C&amp;redir_esc=y</a>
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**Mapping with Programme Outcomes:**

COs	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
<b>CO1</b>	3	3	1	3	2	1	2	2	1	2
<b>CO 2</b>	3	3	2	2	3	3	2	3	3	2
<b>CO 3</b>	2	2	3	3	1	2	1	3	2	1
<b>CO 4</b>	3	3	3	3	3	2	3	2	2	3
<b>CO 5</b>	3	3	2	3	2	3	3	3	3	3

**S-Strong (3)      M-Medium (2)      L-Low(1)**

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