

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

Title of the Course		ELECTIVE BOTANY-II					
Category	Elective	Year	I	Credits	2	CourseCode	121E2A
		Semester	II				
Instructional Hours per week		Lecture	Tutorial	Lab Practice	Total		
		2	1	-	3		
Pre-requisite		To study basics of botany.					
<b>Learning Objectives</b>							
C1	To be familiar with the basic concepts and principles of plant systematics.						
C2	Learn the importance of plant anatomy in plant production systems.						
C3	Understand the mechanism underling the shift from vegetative to reproductive phase.						
C4	To learn about the physiological processes that underlie plant metabolism.						
C5	To know the energy production and its utilization in plants.						
Course outcomes	On completion of this course, the students will be able to						Programme Outcomes
CO1	Understand the fundamental concepts of plant anatomy and embryology.						K1
CO2	Analyze and recognize the different organs of plants and secondary growth.						K2
CO3	Understand water relation of plants with respect to various physiological processes						K3
CO4	Classify aerobic and anaerobic respiration.						K4
CO5	Classify plant systematics and recognize the importance of herbarium and virtual herbarium.						K5
UNIT	CONTENTS						
I	<b>Morphology of Flowering Plants:</b> Plant and its parts- Structure and function of root and stem. Leaf and its parts. Leaf types- simple and compound. Phyllotaxy and types. Inflorescence - Racemose, Cymose and Special types.						
II	<b>Taxonomy:</b> Study of the range of characters and plants of economic importance in the following families: Rutaceae, Caesalpiniaceae, Asclepiadaceae, Euphorbiaceae and Cannaceae						
III	<b>Anatomy</b> Tissue and tissue systems: Simple and complex tissues. Anatomy of monocot and dicot roots - anatomy of monocot and dicot stems - anatomy of dicot and monocot leaves.						
IV	<b>Embryology</b> Structure of mature anther and ovule - Types of ovules, structure of embryo sac, pollination - double fertilization, structure of dicotyledonous and monocotyledonous seeds.						
V	<b>Plant Physiology</b> Absorption of water, photosynthesis - light reaction - Calvin cycle; respiration - Glycolysis - Krebs cycle - electron transport system. Growth hormones - auxins and cytokinins and their applications.						

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

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
<b>Recommended Texts</b>	<ol style="list-style-type: none"> <li>1. Sharma, O.P. 2017. Plant Taxonomy. (II Edition). The McGraw Hill Companies.</li> <li>2. Bhojwani, S.S. Bhatnagar, S.P and Dantu, P.K. 2015. The Embryology of Angiosperms (6th revised and enlarged edition). Vikas Publishing House, New Delhi.</li> <li>3. Maheshwari, P. 1963. Recent Advances in Embryology of Angiosperms. Intl. Soc. Plant Morphologists, New Delhi.</li> <li>4. Salisbury, F. B.C.W. Ross. 1991. Plant Physiology. Wassworth Pub. Co. Belmont.</li> <li>5. Ting, I.P. 1982. Plant Physiology. Addison Wesley Pb. Philippines.</li> </ol>
<b>Reference books</b>	<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. Bhojwani, S.S and Bhatnagar, S.P. 2000. The Embryology of Angiosperms (4th revised and enlarged edition). Vikas Publishing House, New Delhi.</li> <li>3. Pandey, B.P. 2012. Plant Anatomy. S Chand Publishing.</li> <li>4. Jain, VK. 2006. Fundamentals of Plant Physiology, S. Chand and Company Ltd.</li> <li>5. Rajni Gupta. 2012. Plant Taxonomy: Past, Present and Future. <a href="http://www.vedams.com/">Vedams (P) Ltd. New Delhi.</a></li> <li>6. Jain, V.K. 2006. Fundamentals of Plant Physiology, S.Chand and Company Ltd., New Delhi.</li> <li>7. Verma, S.K. 2006. A Textbook of Plant Physiology, S.K.Chand &amp; Co., New Delhi.</li> </ol>
<b>Web Resources</b>	<ol style="list-style-type: none"> <li>1. <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> <li>2. <a href="https://books.google.co.in/books/about/PLANT_TAXONOMY_2E.html?id=Roi0lwSXFnUC&amp;redir_esc=y">https://books.google.co.in/books/about/PLANT_TAXONOMY_2E.html?id=Roi0lwSXFnUC&amp;redir_esc=y</a></li> <li>3. <a href="https://archive.org/EXPERIMENTS/plantanatomy031773mbp">https://archive.org/EXPERIMENTS/plantanatomy031773mbp</a></li> <li>4. <a href="https://www.amazon.in/Embryology-Angiosperms-6th-S-P-Bhatnagar-ebook/dp/B00UN5KPQG">https://www.amazon.in/Embryology-Angiosperms-6th-S-P-Bhatnagar-ebook/dp/B00UN5KPQG</a></li> <li>5. <a href="https://www.crcpress.com/Plant-Physiology/Stewart-Globig/p/book/9781926692692">https://www.crcpress.com/Plant-Physiology/Stewart-Globig/p/book/9781926692692</a></li> </ol>

**Mapping with Programme Outcomes:**

COs	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO 1	3	3	3	3	3	3	3	3	3	3
CO 2	3	3	3	3	3	3	3	3	3	3
CO 3	2	3	3	3	3	1	3	3	3	3
CO 4	3	3	2	3	3	3	3	2	3	2
CO 5	3	2	2	2	2	2	2	1	2	2

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