



University of Kerala

Discipline	BOTANY				
Course Code	UK2DSCBOT102				
Course Title	ANATOMY OF FLOWERING PLANTS				
Type of Course	DSC				
Semester	II				
Academic Level	100 - 199				
Course Details	Credit	Lecture per week	Tutorial per week	Practical per week	Total Hours/Week
	04	03 Hours	-	02 Hours	05 Hours
Pre-requisites	Basic understanding of plant tissues at the higher secondary level				
Course Summary	The course provides a foundational understanding of plant structure, from the cellular level to the organizational complexity of tissues and organs, and also provides students with a comprehensive understanding about wood formation.				

Detailed Syllabus:

Module	Unit	Content	Hrs.
I	Objectives and scope of plant anatomy		05
	1	Definition, objectives, and scope of plant anatomy; Fundamental parts of flowering plant (Brief account only).	
	2	Basic study requirements: Stains (Saffranin), mounting media (Water, Glycerol), and compound microscope (Brief account only).	
	3	Cell wall organization – Gross structure- Primary and secondary wall, pits- plasmodesmata; Cell wall material (cellulose, cutin, lignin, suberin).	
	4	Non-living inclusions of the cell - Reserve food (carbohydrates, proteins), Secretory products (enzymes, nectar), Excretory products -nitrogenous (alkaloids) and non-nitrogenous including gum, resin, essential oils, latex, and mineral crystals-(Cystolith, Raphides).	
II	Plant Tissues		08
	5	Tissues - Meristems: Definition, Classification based on origin, position, plane of cell division, and functions.	
	6	Apical meristem- Theories on the apical organization of shoot apex- Apical cell theory, Histogen theory, Tunica - Corpus theory. Theories on the organization of root apex- Apical cell theory, Histogen theory, and Korper-Kappe theory	
	7	Permanent tissues – Definition, classification – simple, complex, and secretory tissues (schizogenous- lysigenous cavities, glandular hairs, nectary, laticifers).	
III	Tissue Systems		5

	8	Tissue systems- Definition & Types - Epidermal tissue system, Ground tissue system, and Vascular tissue system; Stomata – structure and functions, types (anomocytic, anisocytic, paracytic, diacytic, graminaceous); Different types of vascular arrangements (Conjoint, radial, open, closed, collateral, bicollateral, concentric (amphivasal & Amphicribal).	
IV	Internal structure of plant body -I		12
	9	Primary structure – Root, stem and leaf (Dicot & Monocot)	
	10	Secondary growth – Dicot root and stem; vascular cambium (structure, types, and function); growth rings; dendrochronology. Wood - heart wood and sap wood; hardwood and softwood; ring-porous wood and diffuse-porous wood; tyloses; periderm formation; Bark and lenticels.	
	11	Adaptive (anomalous) secondary growth in stem– <i>Boerhaavia</i> , <i>Bignonia</i> .	
V	Internal structure of plant body -II		15
	12	Anatomy of petiole; Abscission layer.	
	13	Nodal anatomy (brief account only).	
	14	Role of cambium in wound healing and grafting.	
	15	Adaptive Anatomy:– Hydrophytes ,Xerophytes, Epiphytes.	

Practicals		
	<ol style="list-style-type: none"> 1. Observe and record: Non-living inclusions -Cystolith, Raphide; Starch grains - eccentric, concentric, compound; Aleurone grains. 2. Observe and record: Simple permanent tissues- parenchyma, chlorenchyma, aerenchyma, collenchyma, sclerenchyma. 3. Make micro preparation : 4. Study of stomata through peel method: types of stomata -anomocytic, anisocytic, paracytic, diacytic. 5. primary structure: Root: monocot (<i>Colocasia</i>), dicot (Pea /<i>Linmanthemum</i>); Stem: Dicot - (<i>Centella</i>), Monocot - Grass; Leaf- Dicot (<i>Ixora</i>); monocot (grass). 6. secondary structure - Stem (Normal type) – <i>Vernonia</i>, Root – <i>Tinospora / Papaya</i> . 7. Anomalous secondary thickening of Stem - <i>Boerhaavia</i>, <i>Bignonia</i>. 8. Adaptive anatomy: xerophytes (<i>Nerium</i>-leaf), hydrophytes (<i>Hydrilla</i> - stem), epiphytes (<i>Vanda</i> -velamen root). 	30

Suggested reading

1. Bhattacharya H., Ghosh. 2017. A Textbook of Botany, Vol I – IV, NCBA, Kolkata
2. Dickison, W.C. 2000. Integrative Plant Anatomy. Harcourt Academic Press, USA.
3. Evert, R.F. 2006. Esau's Plant Anatomy: Meristems, Cells, and Tissues of the
4. Plant Body: Their Structure, Function and Development. John Wiley and Sons, Inc Fahn,
5. Mauseth, J.D. 1988. Plant Anatomy. The Benjamin/Cummings Publisher, USA.