University of Kerala

Discipline	**BOTANY**				
Course Code	**UK3DSCBOT201**				
Course Title	**HISTOLOGY AND REPRODUCTIVE BOTANY**				
Type of Course	**DSC**				
Semester	**III**				
Academic Level	**200 - 299**				
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 biology at the higher secondary level.				
Course Summary	This course provides basic knowledge of plant internal architecture, cellular composition, and reproduction. This will also help them to understand how different plant tissue evolve and modify their structure and functions with respect to their environment.				

Detailed Syllabus:

Module	Unit	Content	Hrs
I		**Introduction to tissues and tissue systems**	07
	1	Introduction and scope of Plant Anatomy; Structure of Plant Cell and Cell wall, Cell wall organization – Primary and secondary wall, pits, plasmodesmata (Brief account).	
	2	Non-living inclusions of the cell -Reserve food (carbohydrates, proteins, fats,and oil) Secretory products (coloring matter,nectar), excretory products (nitrogenous and non-nitrogenous including resins, tannins, latex, essential oils, gums, and mineral crystals-cystolith, raphides.	
	3	Structure and functions of Meristematic tissues; Classification of meristems; Theories on Apical organization - Apical cell theory, Histoge theory, Tunica-Corpus theory, and Korper Kappe theory. Organization of shoot and root apex in dicots and monocots	
II		**Permanent tissue system**	06
	4	Permanent tissues – Definition, classification – simple, complex, and secretory tissues (glandular tissue, laticifers).	
	5	Tissue systems- Epidermal tissue system, Ground tissue system and vascular tissue systems. Different types of vascular arrangements-collateral, bicollateral, concentric, and radial.	
	6	Stomata – structure and functions, types- anomocytic, anisocytic, paracytic, diacytic, graminaceous.	
III		**Primary and Secondary Structure**	10
	7	Primary structure – Root, stem and leaf (Dicot & Monocot)	
	8	Cambium (structure and function),	

	9	Secondary Growth: Normal Secondary growth in stem and root. Periderm formation – phellum, phellogen and phelloderm; lenticels.	
	10	Wood anatomy: Hard wood, soft wood; Growth ring, Ring porous and diffuse-porous wood; Sapwood and heartwood, Tyloses.	
	11	Anomalous secondary growth – Bignonia, Boerhaavia, Dracaena	
IV	**Reproductive Botany**		**07**
	12	Flower- as a reproductive organ, floral components, and their roles	
	13	Microsporangium: Structure of anther, microsporogenesis, Male gametogenesis. Pollen structure-wall layers, aperture, NPC system of classification, pollen allergy (Only Brief account)	
	14	Megasporangium: types of ovules;Megasporogenesis – female gametophyte – structure of a typical embryosac, types of embryosacs, monosporic - Polygonum type, bisporic–Allium type and tetrasporic- Fritillaria type. Pollination- Types, agents of pollination, (Only Brief account)	
	15	Double fertilization; Endosperm: types – Cellular, Nuclear, and Helobial. Embryogeny- Structure of dicot and monocot embryo; seed formation. Polyembryony.	
V	**Comparative Plant Anatomy**		**15**
	16	Evolutionary trends in plant anatomy - Nodal anatomy	
	17	Anatomical adaptations of plants to different environments (Hydrophytes, Paracites, Xerophytes, Epiphytes	
	18	Applications of anatomy in Plant systematics, Forensics, Pharmacognosy and Dendrochronology, Anatomics (Brief account)	

Practicals		
	1. Non-living inclusions – Cystolith, Raphide, Sphaero- raphide (Druses). 2. Starch grains (Eccentric, Concentric, compound, Aleurone grains 3. Simple permanent tissue- parenchyma, chlorenchyma, aerenchyma, collenchyma, sclerenchyma 4. Primary structure- Dicot stem- Centella/ Chromolaena 5. Monocot stem- Grass and Asparagus 6. Dicot root- Pea/ Limnanthemum, Monocot root- Colocasia or any other monocot root 7. Secondary structure – Stem (Normal type) – Vernonia. 8. Root (Normal type)- Carica papaya, Aerial root- Tinospora and Ficus 9. Epidermal structures- Stomata (Anomocytic, anisocytic, paracytic, diacytic) 10. Anomalous secondary thickening – Bignonia, Boerhaavia, Dracaena 11. Dissect a flower and document (photograph/illustration) 12. Identification of C.S of the anther. 13. Identification and documentation of anther dehiscence pattern in five locally available plants. 14. Dissection of dicot embryo, familiar with different types of ovules	**30**