

**COURSE TITLE** : BOTANY AND ANATOMICAL STRUCTURES  
**COURSE CODE** : 2121  
**COURSE CATEGORY** : B  
**PERIODS PER WEEK** : 4  
**SEMESTER** : 2  
**PERIODS PER SEMESTER** : 60  
**CREDITS** : 4

**TIME SCHEDULE**

Module	Topics	Periods
I	Plant Diversity Test 1	14 1
II	Plant Taxonomy Test 2	14 1
III	Plant Anatomy Test 3	14 1
IV	Primary and Secondary structure of stem and root Test 4	14 1
<b>Total</b>		<b>60</b>

**Course Outcome** :

Module	G.O	Student will be able to:
1	1	Understand about plant diversity
2	1	Understand about the morphology of root, stem and leaves
	2	Apply the knowledge to differentiate between root, stem and leaves
3	1	Understand about plant anatomy and tissues
		Understand plant tissues
4	1	Understand about the primary structure of stem, root and leaves
	2	Understand secondary structure of root and stem

**Specific outcome**

**MODULE – I**

**1.1.0 Understand about plant diversity**

- 1.1.1 Define the word Botany
- 1.1.2 Explain Eichler's system of plant classification
- 1.1.3 Define Algae, Fungi
- 1.1.4 Explain Algae with sketch
- 1.1.5 Explain various type of fungi

- 1.1.6 Illustrate fungi
- 1.1.7 Explain bryophytes with figure
- 1.1.8 List Pteridophytes
- 1.1.9 Explain Pteridophytes, with sketch
- 1.1.10 Explain gymnosperm with examples
- 1.1.11 Describe nucleus structure in general
- 1.1.12 Describe genetic material, DNA (General structure)

## **MODULE-II**

### **2.1.0 Understand about the morphology of root, stem and leaves**

- 2.1.1 Define root system
- 2.1.2 Differentiate between taproot, fibrous root and adventitious root
- 2.1.3 Explain modification of root with Sketches
- 2.1.4 List some plants having taproot modification
- 2.1.5 illustrate taproot modification
- 2.1.6 Describe adventitious root modification, draw diagrams
- 2.1.7 Describe the function of shoot
- 2.1.8 Explain the underground modification of stem
- 2.1.9 Explain aerial stem modification with Sketches
- 2.1.10 List plants of aerial stem modification

### **2.2.0 Apply the knowledge to differentiate between root, stem and leaves**

- 2.2.1 Illustrate different type of leaves, - simple and compound and Explain
- 2.2.2 Describe phyllotaxy
- 2.2.3 Classify Inflorescence plants and Sketch
- 2.2.4 Describe the parts of a flower
- 2.2.5 Distinguish dioecious, monoecious bisexual and unisexual flowers
- 2.2.6 Explain the symmetry of flower
- 2.2.7 Explain placentation with diagramme
- 2.2.8 Describe pollination
- 2.2.9 Explain double fertilization with examples
- 2.2.10 Describe fruits with examples
- 2.2.11 Explain binomial nomenclature
- 2.2.12 Identify the species and character of families such as – annonaceae, malvaceae, anacardiaceae, fabaceae, myrtaceae, rubiaceae, poaceae, apocynaceae, verbenaceae, euphorbiaceae
- 2.2.13 List some examples including economically important Indian timbers

## **MODULE – III**

### **3.1.0 Understand about plant anatomy and tissues**

- 3.1.1 Define anatomy
- 3.1.2 Draw diagram of cell
- 3.1.3 Describe the ultra structure of cell
- 3.1.4 Describe the cell wall with diagram

- 3.1.5 Explain the ultra structure of cell wall and Explain the growth of cell wall
- 3.1.6 Identify the chemical composition of cell wall
- 3.1.7 Define pits
- 3.1.8 Differentiate simple and bordered pits
- 3.1.9 Explain Pits with Diagramme

### **3.2.0 Understand Plant Tissues**

- 3.2.1 Define tissues
- 3.2.2 Define meristem
- 3.2.3 Differentiate between meristmatic & permanent tissues
- 3.2.4 Explain shoot apex and root apex with the diagram
- 3.2.5 Describe the theories of meristem
- 3.2.6 Describe the apical cell theory, histogen theory and tunica corpus theory
- 3.2.7 Explain the various permanent tissues
- 3.2.8 Differentiate between simple and complex tissue
- 3.2.9 Explain origin of vascular bundles
- 3.2.10 Classify different type of vascular bundles

## **MODULE – IV**

### **4.1.0 Understand about the primary structure of stem, root and leaves**

- 4.1.1 Describe the primary structure with a sketch
- 4.1.2 Identify the primary structure
- 4.1.3 Describe the primary structure of dicot stem
- 4.1.4 Illustrate the diagram showing primary structure of dicot stem
- 4.1.5 List dicot plants
- 4.1.6 Describe the primary structure of monocot stem with examples
- 4.1.7 Illustrate monocot plants (structure)
- 4.1.8 Describe the structure of dicot root with sketches

### **4.2.0 Understand secondary structure of root and stem**

- 4.2.1 Describe the structure of dicot leaf with examples
- 4.2.2 Describe the structure of monocot leaf with examples
- 4.2.3 Describe normal secondary growth in dicot stem
- 4.2.4 Define cambial ring
- 4.2.5 Explain importance of cambial ring
- 4.2.6 Define secondary xylems and secondary phloems
- 4.2.7 Define growth rings
- 4.2.8 Differentiate sap wood , heart wood, soft wood and hard wood
- 4.2.9 Explain the structure of tyloses
- 4.2.10 Define periderm
- 4.2.11 Explain periderm formation with diagramme
- 4.2.12 Explain phellem, phellogen and phelloderm

## CONTENT DETAILS

### MODULE – I:

#### **PLANT DIVERSITY**

Introduction – Branches of Botany – Eichler's system of plant, classification Algae – Fungi – Bryophytes – Pteridophytes, (General Account only with one example each). Gymnosperms. Plant cell – nucleus and its importance – genetic material – DNA – genes – gene action – change in gene structure leading to plant diversity.

### MODULE – II:

#### **PLANT TAXONOMY**

Parts of a typical flowering plant (Eg., Root system – tap root, fibrous root, adventitious root)  
Leaves – Parts of a leaf – simple leaf – compound leaf – phyllotaxy, Inflorescence – definition – classification – racemose – cymose – special type – parts of a flower, type of flowers – floral whorls – placentation – pollination – fertilization. Angiosperm taxonomy:- Binomial nomenclature – description and identifying characters of the following families with emphasis on economically important plants.

1. Annonaceae - Annona, Polyalthia
2. Fabaceae - Tamarindus, Accasia
3. Rubiaceae - Ixora, Hamelia
4. Verbanacea - Latana, Tectona
5. Poaceae - Paddy, Wheat
6. Malvaceae – Gossypium, Hibiscus
7. Euphorbiaceae - Rubber
8. Myrtaceae - Euclalyptus sps.

### MODULE – III:

#### **PLANT ANATOMY**

Cell – Ultra structure, living and non-living inclusions cell wall – Ultra structure – pits – plasmodesmata. Tissues – Meristematic and Permanent meristems – Definition – General characters – Types of meristems, based on position – origin shoot apex – root apex – theories of meristems – permanent tissues – classification – simple tissues – complex tissues. Vascular bundles – origin – types – conjoint – collateral – open and closed – eccentric-concentric – amphivasal – amphicribal – radial.

### MODULE – IV:

#### **PRIMARY AND SECONDARY STRUCTURE OF STEM AND ROOT**

Primary structure of Dicot stem (Eupatorium). Monocot stem (Grass), Dicot root (Tinospora), Monocot root (Colocasia) Structure of dicot leaf (Ixora), Structure of monocot leaf (Grass) Normal secondary growth in dicot stem – cambial ring – cambial activity secondary xylem – secondary phloem growth rings – soft wood – hard wood – sap wood – heart wood – tyloses – its structure – periderm formation – phellem – phellogen – phelloderm – lenticels functions.

## **REFERENCE**

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