

(Semester III)

Paper 6: MORPHOLOGY AND ANATOMY OF ANGIOSPERMS

THEORY

Unit 1: Plant Morphology

Morphology of root, stem and leaf.

(2 Periods)

Unit 2: Tissues

Classification of tissues; Simple and complex tissues (no phylogeny); Pits and plasmodesmata; Wall ingrowths and transfer cells, Ergastic substances.

(11 Periods)

Unit 3: Stem

Organization of shoot apex (Apical cell theory, Histogen theory, Tunica Corpus theory, continuing meristematic residue, cytohistological zonation); Types of vascular bundles; Structure of dicot and monocot stem.

(5 Periods)

Unit 4: Leaf

Structure of dicot and monocot leaf, Kranz anatomy.

(3 Periods)

Unit 5: Root

Organization of root apex (Apical cell theory, Histogen theory, Korper-Kappe theory); Quiescent centre; Root cap; Structure of dicot and monocot root; Endodermis, exodermis and origin of lateral root.

(5 Periods)

Unit 6: Vascular Cambium

Structure, function and seasonal activity of cambium; Secondary growth in root and stem.

(6 Periods)

Unit 7: Wood

Axially and radially oriented elements; Types of rays and axial parenchyma; Cyclic aspects and reaction wood; Sapwood and heartwood; Ring and diffuse porous wood; Early and late wood, tyloses; Dendrochronology.

(5 Periods)

Unit 8: Periderm

Development and composition of periderm, rhytidome and lenticels.

(2 Periods)

Unit 9: Adaptive and Protective Systems

Epidermal tissue system, cuticle, epicuticular waxes, trichomes(uni-and multicellular, glandular and nonglandular, two examples of each), stomata (classification); Adcrustation and incrustation; Anatomical adaptations of xerophytes and hydrophytes. **(7 Periods)**

Unit 10: Secretory System

Hydathodes, cavities, lithocysts and laticifers. **(2 periods)**

PRACTICALS

Study of anatomical details through permanent slides/temporary stain mounts/ macerations/ museum specimens with the help of suitable examples.

1. Apical meristem of root, shoot and vascular cambium.
2. Distribution and types of parenchyma, collenchyma and sclerenchyma.
3. Xylem: Tracheary elements-tracheids, vessel elements; thickenings; perforation plates; xylem fibres.
4. Wood: ring porous; diffuse porous; tyloses; heart- and sapwood.
5. Phloem: Sieve tubes-sieve plates; companion cells; phloem fibres.
6. Epidermal system: cell types, stomata types; trichomes: non-glandular and glandular.
7. Root: monocot, dicot, secondary growth.
8. Stem: monocot, dicot - primary and secondary growth; periderm; lenticels.
9. Leaf: isobilateral, dorsiventral, C4 leaves (Kranz anatomy).
10. Adaptive Anatomy: xerophytes, hydrophytes.
11. Secretory tissues: cavities, lithocysts and laticifers.

ESSENTIAL READINGS

1. Dickison, W.C. (2000). Integrative Plant Anatomy. Harcourt Academic Press, USA.
2. Fahn, A. (1974). Plant Anatomy. Pergmon Press, USA.
3. Mauseth, J.D. (1988). Plant Anatomy. The Benjammin/Cummings Publisher, USA.
4. Esau, K. (1977). Anatomy of Seed Plants. John Wiley & Sons, Inc., Delhi.