

SEMESTER 2nd
MAJOR COURSE

BOT222J: BOTANY – 2: ANATOMY OF ANGIOSPERMS

CREDITS: THEORY: 04; PRACTICALS: 02

Objectives: To aware the students about the fundamental concept of plant anatomy, to make them understand the structure of different organs of plant, secondary growth and structure of wood in plants.

THEORY (04 CREDITS)

UNIT I: PLANT TISSUES

Classification of tissues; meristematic tissue, classification and types of meristems, differentiation of meristematic tissues
Permanent Tissues; simple tissues (parenchyma, collenchyma, sclerenchyma), Complex Tissue (xylem and phloem)
Functions of tissues
Secretory tissues; structure, classification and functions, Pits and plasmodesmata, Wall ingrowths and transfer cells

UNIT II: APICAL MERISTEM ORGANIZATION AND ANATOMY OF DIFFERENT ORGANS Organization of shoot apex (Apical cell theory, Histogen theory, Tunica Corpus theory)
Organization of root apex (Apical cell theory, Histogen theory, Korpe-Kappe theory), quiescent center, root cap Structure of monocot and dicot stem. Structure of a monocot and dicot root
Structure of monocot and dicot leaf, Kranz anatomy.

UNIT III: SECONDARY GROWTH Cambium- types, structure and functions; Vascular Cambium: Secondary growth in typical dicot stem General account of wood structure (Heart wood and Sap wood), seasonal activity of cambium, secondary growth in stem, anomalous secondary growth, types of rays and axial parenchyma, early and late wood, periderm, rhytidome and lenticles

UNIT IV INTERNAL ORGANIZATION OF PLANT BODY, ECOLOGICAL AND APPLIED ANATOMY

Epidermal tissue systems; general structure and function of cuticle, cuticular waxes, trichomes, stomata Ground tissue; cortex, pericycle, medulary rays and pith; types and arrangement of vascular bundles.
General account of adaptations in xerophytes and hydrophytes, reaction wood Applications of anatomical studies in climatology and taxonomy Anatomical response of plants to pollutants
Dendrochronology

PRACTICALS (02 CREDITS)

1. Study of distribution and types of parenchyma, collenchyma and sclerenchyma,
2. Study of root and shoot apical meristems.
3. Vascular cambium
4. Xylem: Tracheary elements-tracheids, vessel elements; thickenings; perforation plates; xylem fibres. Phloem; Sieve tubes-sieve plates; companion cells; phloem fibres.
5. Wood: ring porous; diffuse porous; tyloses; heart- and sapwood.
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. Study of xerophytes and hydrophytes

SUGGESTED READINGS

1. Cutler, D.F., Botha, T. and Stevenson, D.W. 2008. Plant anatomy: An applied approach. Wiley-Blackwell Publishers.
2. Evert, R.F. and Esau, K. 2006. Esau's Plant Anatomy. John Wiley and Sons.
3. Pandey, B.P. (2001). Plant Anatomy. S. Chand and Company, New Delhi.
4. Mauseth, J. D. (1988). Plant Anatomy. The Benjamin/ Cummings Publisher, USA
5. Pandey, B. P. (2010) Modern practical botany volume II.S. Chand & Company Ltd. New Delhi.
6. Fahn, A. (1974). Plant Anatomy, Pegmon Press USA.
7. Dickison, W.C. (2000). Integrative Plant Anatomy, Harcourt Academic Press, USA