POOL OF DSE

DISCIPLINE SPECIFIC ELECTIVE COURSE –DSE-10

Course title & Code	Credits	Credit distribution of the course			Eligibility criteria	Pre-requisite of the course (if any)
		Lecture	Tutorial	Practical/ Practice		
Plant development and anatomy (BS-DSE-10)	**4**	**2**		**2**	Class XII pass with Biology and chemistry, as one of the papers in Class XII	**NA**

Learning Objectives:

The objective of this paper is to provide the students with internal basic structure and cellular composition ofthe plant body. This will help them to understand how different plant tissue structures evolve and modify theirfunctions with respect to the environment. To acquaint the students with the study of various plant tissue systems and their development and functions in plants.

Learning Outcomes:

On successful completion of the course, a student will:

- Have knowledge about the various cells and tissues, meristems, epidermal and vascular tissue systemsin plants.
- Understand various aspects of growth, development of the tissues and differentiation of various plantorgans.
- Have knowledge of basic structure and organization of plant parts in angiosperms.
- Correlate the structure with morphology and functions.

SYLLABUS FOR DSE-10

Course Contents - Theory

Unit 1: Meristematic and Permanent Tissues **No. of hours: 10**

Classification of Tissues, Simple and complex tissues (no phylogeny), Types of meristems: Root and Shoot Apical Meristems (describe theories in brief with special reference to Tunica Corpus andKorper-Kappe Theory), Pits and plasmodesmata, wall ingrowths and transfer cells, Ergastic substances

Unit 2: Secondary growth **No. of hours: 10**

Vascular Cambium: Structure and function, seasonal activity; Structure of monocot and dicot stem, root and leaf; Secondary growth in root and stem; wood (Heartwood and Sapwood; Tension wood; Ring and Diffuse porous wood; early and late wood); Tyloses Cork Cambium and its derivatives and function: Rhytidome

Unit 3: Adaptive and Protective Systems **No. of hours 10**

Epidermal tissue system; Cuticle; Epicuticular waxes; Trichomes (Uni and multicellular, glandular and non- glandular, two examples of each); secretory tissues (hydathodes, mucilage ducts, resin ducts, oil glands, laticifers, lysigenous and schizogenous cavities); Stomata (Classification); Adcrustation and Incrustation; Anatomical adaptation of xerophytes and hydrophytes.

PRACTICALS

CREDITS: 2 **TOTAL HOURS: 60**

1. Study of root and shoot apical meristem through permanent slides. Study of distribution and types ofParenchyma, Collenchyma and Sclerenchyma through permanent slides.
2. Study of xylem and phloem elements through maceration.
3. Study of primary growth in Monocot and Dicot stem through temporary mounts
4. Study of secondary growth in Dicot stem through temporary mounts
5. Study of Monocot and Dicot root through temporary mounts – Primary growth
6. Study of secondary growth in Dicot root through temporary mounts
7. Study of isobilateral and dorsiventral leaf through temporary mounts/permanent slides
8. Study of different types of wood (ring porous; diffuse porous; tyloses; heartwood and sapwood)through permanent slides/museum specimens.
9. Study of stomata types through epidermal peel mount.
10. Study of trichomes (glandular and non-glandular), cystoliths, druses, raphides, starch grains, sclereidsand stone cells through permanent slides
11. Study of anatomical adaptations in Hydrophytes (*Nymphaea* or *Hydrilla*) and Xerophytes (*Nerium*leaf).

Essential Readings

i. Dickinson, W.C. (2000). *Integrative Plant Anatomy.* Cambridge, U.K. : Harcourt Academic Press.
ii. Esau K. (1977). *Anatomy of Seed Plants.* New Delhi, Delhi: John Wiley & Sons, Inc.
iii. Evert, R.F., Eichhorn, S.E. (2006). *Esau's Plant Anatomy: Meristems, Cells, and tissues of the plantbody: their structure, function and development.* New Jersey, U.S.: Wiley-Liss.
iv. Fahn, A. (1974). *Plant Anatomy.* Pergmon Press, USA and U.K.

Suggested Readings

1. Mauseth, J.D. (1988). *Plant Anatomy.* San Francisco, California: The Benjammin CummingsPublisher.
2. Raven, F.H., Evert, R.F., Eichhorn, S.E. (1992). *Biology of Plants.* New York, NY: W.H. Freemanand Company.