B.Sc. II Year

Semester – III

BBO-C301

DSC-3 Plant Anatomy and Embryology

MM : 100
Time : 3 hrs

Seasonal : 30
ESE : 70
Pass Marks : 40

Learning objective:

- To understand the importance of plant anatomy and embryology.
- To acquire knowledge of meristematic tissues, adaptive and protective systems, secondary growth and histology.
- To become familiar with structural organization of flower, pollination and fertilization, plant embryology.
- To become familiar with general techniques used inplant anatomy and embryology.

Learning outcomes:

At the end of course student will be able

- The student will be able to understand basics of plant anatomy and embryology.
- The student will be able to adaptive and protective systems, secondary growth, structural organization of flower, pollination and fertilization.
- The student will be equipped to understand the various methods and techniques used in plant anatomy and embryology.
- The student will be able take the decisions for carrier point of views in research, industries and academia entrepreneurships etc.

Unit 1: Tissue: Meristematic and Permanent Tissues **(12 Lectures)**

Structure of dicot and monocot root, stem and leaf. Root and shoot apical meristems; Distinguish between meristematic, and permanent tissues.

Unit 2: Adaptive and Protective Systems, Secondary Growth **(16 Lectures)**

Epidermis, cuticle, stomata; General account of adaptations in xerophytes and hydrophytes. Vascular cambium – structure and function, seasonal activity. Secondary growth in root and stem, Wood: distinguish between heartwood and sapwood.

Unit 3: Structural Organization of Flower: Pollination and Fertilization **(8 Lectures)**

Structure of anther and pollen. Structure and types of ovules. Types of embryo sacs, organization and ultrastructure of mature embryo sac. Pollination mechanisms and adaptations; Double fertilization. Seed-structure appendages and dispersal mechanisms.

Unit 4: Embryo and Endosperm **(8 Lectures)**

Endosperm types, structure and functions. Dicot and monocot embryo; Embryo-endosperm relationship.

Unit 5: Apomixis and Poly-embryony **(8 Lectures)**

Definition of Apomixis and Poly-embryony, types, practical applications and economic importance in plant science.

DSC-3 SEMESTER-III BBO-C351(LAB COURSE-CC-03)

1. Study of meristems through permanent slides and photographs.
2. Tissues (parenchyma, collenchyma and sclerenchyma); Macerated xylary elements, Phloem (Permanent slides, photographs)
3. Stem: Monocot: *Zea mays;* Dicot: *Helianthus*; Secondary: *Helianthus* (only Permanent slides).
4. Root: Monocot: *Zea mays*; Dicot: *Helianthus*; Secondary: *Helianthus* (only Permanent slides).
5. Leaf: Dicot and Monocot leaf (only Permanent slides).
6. Adaptive anatomy: Xerophyte (*Nerium* leaf); Hydrophyte (*Hydrilla* stem).
7. Structure of anther (young and mature), tapetum (amoeboid and secretory) (Permanent slides).
8. Types of ovules: anatropous, orthotropous, circinotropous, amphitropous/ campylotropous.
9. Female gametophyte: *Polygonum* (monosporic) type of Embryo sac Development (Permanent slides/photographs).
10. Ultrastructure of mature egg apparatus cells through electron micrographs.
11. Pollination types and seed dispersal mechanisms (including appendages, aril, caruncle) (Photographs and specimens).
12. Dissection of embryo/endosperm from developing seeds.
13. Calculation of percentage of germinated pollen in a given medium.

Suggested readings: Anatomy

1. Dickinson, W.C. 2000 Integrative Plant Anatomy. Harcourt Academic Press, USA.
2. Fahn, A. 1974 Plant Anatomy. PergmonPress, USA and UK.
3. Mauseth, J.D. 1988 Plant Anatomy. The Benjammin/Cummings Publisher, USA.
4. Esau, K. 1977 Anatomy of Seed Plants. Wiley Publishers.
5. Taiz, L. &Zeiger, E. 2006 Plant Physiology. (4th edition) Sinauer Associates, Inc. Sunderland,

Embryology

1. Maheswari,P(1963) :Recent Advances in the Embryology of Angiosperms(Ed.) International Society of Plant Morphologists- University of Delhi.
2. Swamy. B.G.L. &Krishnamoorthy. K.V.(1980):From flower to fruit. Tata McGraw Hill Publishing Co., Ltd., New Delhi.
3. Maheswari, P.(1985):An Introduction to the Embryology of Angiosperms Tata McGraw Hill Publishing Co.,Ltd., New Delhi.
4. Bhojwani, S.S. &Bhatnagar, S.P. (2000) : The Embryology of Angiosperms (4th Edition) Vikas Publishing House(P)Ltd., UBS Publisher's Distributors, New Delhi.

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