CLUSTER UNIVERSITY, SRINAGAR

Syllabus for Botany

Semester III

Core Course Botany-Paper III

Plant Anatomy and Embryology (Credits; Theory-4, Practicals-2)

Theory
(Lectures: 60)

UNIT 1: PLANT TISSUES AND ORGANS (12 Lectures)

Meristematic and permanent tissues: Simple and Complex tissue (Types and Functions); Organization of root and shoot apical meristem- Histogen theory; Tunica and corpus theory.

Plant organs: Structure of a typical dicot and monocot root, stem and leaf.

UNIT II: SECONDARY GROWTH AND ADAPTATIONS (16 Lectures)

Secondary growth: Cambium- types, structure and function; Secondary growth in typical dicot root and stem (*Helianthus*); General account of wood structure (Heart wood and Sap wood).

Adaptations: General structure and function of cuticle, epidermis and stomata; types of stomata; General account of anatomical adaptations in xerophytes and hydrophytes.

UNIT III: FLOWER AND POLLINATION (16 Lectures)

Structural organization of flower: Development and structure of anther and pollen; Structure and types of ovules; Types of embryo sacs; Structure of a typical embryo sac.

Pollination and fertilization: Types of pollination –Floral modifications favoring self and cross pollination; Double fertilization; Seed dispersal mechanism.

UNIT IV: EMBRYO AND ENDOSPERM (16 Lectures)

Embryo and Endosperm: Endosperm development, structure and functions; Structure and development of dicot and monocot embryo (*Capsella-bursa pestoris*; maize).

Apomixis and Embryogeny: Definition, types and practical applications of apomixis and polyembryony.

Practicals

1. Study of meristems through permanent slides/bio-visual aids.
2. Tissues (Parenchyma,Collenchymas and Sclerenchyma) through permanent slides and photographs.
3. Adaptive anatomy: Xerophytes (Nerium leaf); Hydrophyte (*Hydrilla* stem)
4. Structure of anther (young and mature), Tapetum -amoeboid and secretory (through permanent slides/materials/ bio-visual aids).
5. Types of Ovules; anatropous, orthotropous, circinotropous, amphitropous, campylotropous (through permanent slides/materials/ bio-visual aids).
6. Female gametophyte; *Polygonum* (monosporic) type of embryo sac development (through permanent slides and photographs).
7. Ultrastructure of mature egg apparatus cells through electron micrograph.
8. Pollination types and seed dispersal mechanisms (including appendages, aril, caruncle) through photograph and specimens.
9. Root: Monocot: *Zea mays*; Dicot: *Helianthus* (Preparation of temporary mount and permanent slides) Secondary: *Helianthus* (Permanent slides only).
10. Stem: Monocot: *Zea mays*; Dicot : *Helianthus* (Preparation of temporary mount and permanent slides) Secondary *Helianthus*(Permanent slides only).
11. Leaf: Dicot and monocot leaf (Preparation of temporary mount and permanent slides).
12. Dissection of embryo/endosperm from developing seeds.
13. Calculation of percentage of germinated pollen in a given medium.