MB-06
PLANT DEVELOPMENT AND REPRODUCTION

Units	Topics
I	**Introduction:** Unique features of plant development; difference between animal and plant development. **Seed germination and seedling growth:** Metabolism of nucleic acids, proteins and mobilization of food reserves; tropisms; hormonal control of seedling growth; gene expression; use of mutants in understanding seedling development.
II	**Shoot development:** Organization of the shoot apical meristem (SAM); cytological and molecular analysis of SAM; control of cell division and cell to cell communication; control of tissue differentiation, especially xylem and phloem; secretory ducts and laticifers; wood development in relation to environmental factors. **Leaf growth and differentiation:** Determination; phyllotaxy; control of leaf form; differentiation of epidermis (with special reference to stomata and trichomes) and mesophyll. **Root development:** Organization of root apical meristem (RAM); cell fates and lineages; vascular tissue differentiation; lateral roots; root hairs; rootmicrobe interactions.
III	**Reproduction:** Vegetative options and sexual reproduction; flower development; genetics of floral organ differentiation; homeotic mutants in Arabidopsis and Antirrhinum; sex determination. **Male gametophyte:** Structure of anthers: microsporogenesis, role of tapetum; pollen development and gene expression: male stenlity: sperm dimorphism and hybrid seed production: pollen germination, pollen tube growth and guidance; pollen storage: pollen allergy: pollen embryos, **Female gametophyte:** Ovule development: megasporogenesis: organization of the embryo sac, structure of the embryo sac cells.
IV	**Pollination, pollen-pistil interaction and fertilization:** Floral characteristics, pollination mechanisms and vectors; bredding systems: commercial considerations: structure of the pistill; pollen-stigma interactions, sporophytic and gametophytic self-incompatibility (cytological, biochemical and molecular aspects): double fertilization: in vitro fertilization. **Seed development and fruit growth:** Endosperm development during early, maturation and desiccation stages; embryogenesis, ultrastructure and nuclear cytology; cell lineages during late embryo development; storage proteins of endosperm and embryo; polymbryony; apomixis; embryo culture; dynamics of fruit growth; biochemistry and molecular biology of fruit maturation.
V	**Latent life - dormancy:** Importance and types of dormancy; seed dormancy; overcoming seed dormancy; bud dormancy. **Senescence and programmed cell death (PCD):** Basic concepts, types of cell death, PCD in the life cycle of plants, metabolic changes associated with senescence and its regulation; influence of hormones and environmental factors on senescence.