PONDICHERRY UNIVERSITY
SYLLABUS FOR ENTRANCE EXAMINATION
(Ph. D in Vegetable Science)

PRODUCTION TECHNOLOGY OF COOL SEASON VEGETABLE CROPS

- Area, production and productivity of cool season vegetable crops, Scope and importance of cool season vegetable crops, production technology of Potato, garlic and leek
- Production technology of Cabbage, cauliflower, kohlrabi, broccoli, Brussels sprouts, kale and chow chow.
- Production technology of Carrot, radish, turnip and beetroot.
- Production technology of Peas and beans—Garden pea, French bean, broad bean, lettuce and palak
- Production technology of spinach, asparagus, globe artichoke and other minor cool season vegetables; protected cultivation and precision farming in cool season vegetables

PRODUCTION OF WARM SEASON VEGETABLE CROPS

- Tomato, brinjal, hot pepper and sweet pepper
- Okra, Indian bean (Sem), cluster bean and cowpea.
- Cucumber, ash gourd, bottle gourd, ridge gourd, snake gourd, bitter gourd and water melon
- Musk melon, pumpkin, squashes, coccinea and sweet potato
- Elephant foot yam, taro, tapioca, yam, amaranth and drumstick

GROWTH AND DEVELOPMENT OF VEGETABLE CROPS

- Introduction and phytohormones—Definition of growth and development; Cellular structures and their functions; Physiology of phyto-hormones functioning/ biosynthesis and mode of action; Growth analysis and its importance in vegetable production; Physiology of dormancy and germination—Physiology of dormancy and germination of vegetable seeds, tubers and bulbs

- Role of auxins, gibberellins, cyktokinins and abscisic acid; Application of synthetic PGRs including plant growth retardants and inhibitors for various purposes in vegetable crops; Role and mode of action of morphactins, anti-transpirants, anti-auxin, ripening retardant and plant stimulants in vegetable crop production.

- Abiotic factors—Impact of light, temperature, photoperiod, carbon dioxide, oxygen and other gases on growth, development of underground parts, flowering and sex expression in vegetable crops; Apical dominance.

- Phototropism, Fruit physiology—Physiology of fruit set, fruit development, fruit growth, flower and fruit drop; Parthenocarpy in vegetable crops

- Ethylene inhibitors, senescence and abscission; fruit ripening and physiological changes associated with ripening, Morphogenesis and tissue culture—Morphogenesis and tissue culture techniques in vegetable crops; Grafting techniques in different vegetable crops.

PRINCIPLES OF VEGETABLE BREEDING

- Importance and history- Importance, history and evolutionary aspects of vegetable breeding and its variation from cereal crop breeding.

- Selection procedures- Techniques of selfing and crossing; Breeding systems and methods; Selection procedures and hybridization; Genetic architecture; Breeding for biotic stress (diseases, insect pests and nematode), abiotic stress (temperature, moisture and salt) resistance and quality improvement; Breeding for water use efficiency (WUE) and nutrients use efficiency (NUE).

- Heterosis breeding- Types, mechanisms and basis of heterosis, facilitating mechanisms like male sterility, self-incompatibility and sex forms.

- Mutation and Polyploidy breeding; Improvement of asexually propagated vegetable crops and vegetables suitable for protected environment.

- Ideotype breeding- Ideotype breeding; varietal release procedure; DUS testing in vegetable crops; Application of In-vitro and molecular techniques in vegetable improvement.

PRODUCTION OF UNDERUTILIZED VEGETABLE CROPS

- Scope and importance of underutilized vegetable crops, Asparagus, leek, Chinese chive, red cabbage, Chinese cabbage and kale

- Lettuce, celery, parsley, endive, chicory and Indian spinach

- Spinach, chenopods, chekurmani, black nightshade, *solanum tarvum* and sweet gourd.

- Spine gourd, teasle gourd, round gourd, and little/ Ivy gourd, athalakai, pointed gourd and kachri,

- Long melon, snap melon, gherkin, yam bean, lima bean, winged bean and Underutilized yams

SYSTEMATICS OF VEGETABLE CROPS

- Significance of systematic—Significance of systematics and crop diversity in vegetable crops; Principles of classification; different methods of classification; Salient features of international code of nomenclature of vegetable crops

- Origin, history, evolution and distribution of vegetable crops; Botanical description of genera, species and morphological important key to identify the solanaceae and cucurbitaceae family vegetables

- Botanical description of genera, species and morphological important key to identify the cruciferaceae, alliaceae, malvaceae, umbelliferae and chenopodiacae family vegetables

- Botanical description of genera, species and morphological important key to identify the fabaceae, moringaceae, amaranthaceae, euphorbiaceae and convolvulaceae, araceae, dioscoreaceae and labiatae family vegetables

- Cytological level of various vegetable crops with descriptive keys; Molecular markers—Importance of molecular markers in evolution of vegetable crops; Molecular markers as an aid in characterization and taxonomy of vegetable crops

POST-HARVEST MANAGEMENT OF VEGETABLE CROPS

- Importance and scope—Importance and scope of post-harvest management of vegetables; Maturity indices and standards for different vegetables; Methods of maturity determination; physiology and biochemistry in vegetables.

- Biochemistry of maturity and ripening; Enzymatic and textural changes; Ethylene evolution and ethylene management; Respiration and transpiration along with their regulation methods; harvesting tools and methods in major vegetables

- Harvesting and losses factors—Harvesting tools and practices for specific market requirement; Postharvest physical and biochemical changes; Preharvest practices and other factors affecting postharvest losses; precooling

- Packing house operations—Packing house operations; Commodity pretreatments chemicals, wax coating, irradiation; Packaging of vegetables, prevention from infestation, management of postharvest diseases and principles of transportation

- Methods of storage—Ventilated, refrigerated, modified atmosphere and controlled atmosphere storage, hypobaric storage and cold storage; Zero-energy cool chamber, storage disorders like chilling injury in vegetables