

### **Unit 1: Post-Harvest Technology of Vegetable Crops**

Scope and importance of post-harvest management of vegetables; Nature and causes of post-harvest losses; Maturity indices and standards for different vegetables; methods of assessment of maturity, physiological and biochemical changes during maturity and ripening, enzymatic and textural changes, ethylene evolution and ethylene management, respiration, transpiration, regulation methods; Influence of pre-harvest practices and other factors affecting shelf life and post-harvest quality; Harvesting methods, tools, harvesting practices for specific market requirements; pre cooling methods; grading, washing, pack house operations, pre treatments-chemicals, wax coating, edible coating, pre packaging and irradiation; packaging of vegetables, packaging materials; Storage methods - ventilated, refrigerated, MA, CA storage, hypobaric storage, cold storage, zero energy cool chamber; Storage disorders -chilling injury in vegetables, post-harvest diseases and pests - prevention from infestation; principles of transport; food safety standards and export standards.

### **Unit 2: Post-Harvest Technology of Fruit Crops**

Scope and importance of post-harvest management of fruits; Factors leading to post-harvest losses; Maturity indices, methods of assessment of maturity, harvesting practices and grading for specific market requirements; Physiological and biochemical changes during maturity and ripening, ethylene evolution and ethylene management; enzymatic and textural changes, respiration, transpiration; Influence of pre-harvest practices and other factors affecting shelf life and post-harvest quality; Harvesting methods, tools, harvesting practices for specific market requirements; Pre cooling methods; grading, washing, pack house operations, pre treatments treatment prior to shipment, viz., chlorination, waxing, chemicals, bio-control agents and natural plant products, fungicides, hot water, vapour heat treatment, sulphur fumigation and irradiation; Pre packaging and irradiation, packaging of fruits, packaging materials; Storage methods - ventilated, refrigerated, MAS, CA storage ; Physical injuries and disorders; Transportation and marketing standards for international markets, quality evaluation, principles and methods of preservation, food processing, canning, fruit juices, beverages, pickles, jam, jellies, candies; Dried and dehydrated products, nutritionally enriched products, fermented fruit beverages, packaging technology, processing waste management, food safety standards and export standards.

### **Unit 3: Value Addition of flowers**

Prospects of value addition; National and global scenario, production and export; Women empowerment through value added products making, supply chain management; Types of value added products, value addition in loose flowers, garlands, veni, floats, floral decorations; Value addition in cut flowers, flower arrangement, styles, Ikebana, morebana, free style, bouquets, button-holes, flower baskets, corsages, floral wreaths, garlands, floral craft setc.; Selection of containers and accessories for floral products and decorations; Aromatherapy, pigment and

natural dye extraction techniques; Dry flowers – Identification and selection of flowers and plant parts; Raw material procurement, preservation and storage; Techniques in dry flower making – Drying, bleaching, dyeing, embedding, pressing; Accessories; Designing and arrangement – dry flower baskets, bouquets, pot-pourri, wall hangings, button holes, greeting cards, wreaths; Packing and storage; Concrete and essential oils; Selection of species and varieties (including non-conventional species), extraction methods, Packaging and storage, Selection of species and varieties, Types of pigments, carotenoids, anthocyanin, chlorophyll, betalains; Significance of natural pigments, Extraction methods; Applications ; Export standards.

#### **Unit 4: Processing of Plantation Crops, Spices, Medicinal and Aromatic Plants**

Prospects of processing and value addition, National and global scenario, production and exports; Commercial uses of spices and plantation crops. Processing of major spices - cardamom, black pepper, ginger, turmeric, chilli and paprika, vanilla, cinnamon, clove, nutmeg, allspice, coriander, fenugreek, curry leaf. Extraction of oleoresin and essential oils; Processing of produce from plantation crops, viz. coconut, arecanut, cashewnut, oil palm, palmyrah, date palm, cocoa, tea, coffee, rubber etc; Processing of medicinal plants– dioscorea, gloriosa, stevia, coleus, ashwagandha, tulsi, isabgol, safedmusli, senna, aloe, catharanthus, etc. Different methods of drying and storage. Microbial contamination of stored product. Influence of temperature and time combination on active principles; Extraction and analysis of active principles using TLC/HPLC/GC. Distillation, solvent extraction from aromatic plants– davana, mint, rosemary, rose, citronella, lavender, jasmine, etc. Extraction of aroma compounds and aromatherapy; Extraction of pharmaceutical and nutraceutical compound from medicinal and aromatic crops; Application of nano technology in medicinal and aromatic plants. Applications; Export standards.