Unit 1. PRODUCTION OF PLANTATION CROPS
Role of plantation crops in national economy, export potential, IPR issues, clean development mechanism, classification and varietal wealth. Plant multiplication including in vitro multiplication, systems of cultivation, multiltier cropping, photosynthetic efficiencies of crops at different tiers, rainfall, humidity, temperature, light and soil pH on crop growth and productivity, high density planting, nutritional requirements, physiological disorders, role of growth regulators and macro and micro nutrients, water requirements, fertigation, moisture conservation, shade regulation, weed management, training and pruning, crop regulation, maturity indices, harvesting. Cost benefit analysis, organic farming, management of drought, precision farming. Crops: Coffee and tea, Cashew and cocoa, Rubber, palmyrah and oil palm, Coconut and arecanu, Wattle and betel vine.

Unit 2. PRODUCTION TECHNOLOGY OF SPICE CROPS
Introduction, importance of spices crops—historical accent, present status—national and international, future prospects, botany and taxonomy, climatic and soil requirements, commercial varieties/hybrids, site selection, layout, sowing/planting times and methods, seed rate and seed treatment, nutritional and irrigation requirements, intercropping, mixed cropping, intercultural operations, weed control, mulching, physiological disorders, harvesting, post harvest management, plant protection measures and seed planting material and micro-propagation, precision farming, organic resource management, organic certification, quality control, pharmaceutical significance and protected cultivation of: Black pepper, cardamom, Clove, cinnamon and nutmeg, allspice, Turmeric, ginger and garlic, Coriander, fenugreek, cumin, fennel, ajowain, dill, celery, Tamarind, garcinia and vanilla.

Unit 3. AGRONOMY OF MEDICINAL, AROMATIC AND UNDER-UTILIZED CROPS
Importance of medicinal and aromatic plants in human health, national economy and related industries, classification of medicinal and aromatic plants according to botanical characteristics and their uses, export potential and indigenous technical knowledge; Climate and soil requirements; cultural practices; yield and important constituents of medicinal plants (Mulhati, Isabgol, Rauwolfia, Poppy, Aloe vera, Satavar, Stevia, Safed Musli, Kalmegh, Asaphoetida, Nux vomica, Rosadle etc); Climate and soil—requirements; cultural practices; yield and important constituents of aromatic plants (Citronella, Palmarosa, Mentha, Basil, Lemon grass, Rose, Patchouli, Geranium); Climate and soil requirements; cultural practices; yield of under-utilized crops (Rice bean, Lathyrys, Sesbania, Clusterbean, French bean, Fenugreek, Grain Amaranth, Coffee, Tea and Tobacco); Post harvest handling—drawing, processing, grading, packing and storage, value addition and quality standards in herbal products.

Unit 4. BREEDING OF PLANTATION CROPS AND SPICES
Species and cultivars, cytogenetics, survey, collection, conservation and evaluation, blossom
Unit 5. BREEDING OF MEDICINAL AND AROMATIC CROPS

Plant bio-diversity, conservation of germplasm, IPR issues, Major objectives of breeding of Medicinal and Aromatic Crops, Scope for introduction; cytogenetic background of important Medicinal and Aromatic Crops; Scope for improvement of Medicinal and Aromatic Crops through selection, intra and interspecific hybridization, induced autotetraploidy, mutation breeding and biotechnological approaches; Breeding for yield and quality improvement in medicinal plants, Breeding for high herbage yield, essential oil and quality components, secondary metabolites in medicinal and aromatic crops; Genetics of active principles and assay techniques useful in evaluation of breeder's material. Breeding problems in seed and vegetatively propagated medicinal and aromatic crops; Achievements and prospects in breeding of medicinal crops, viz. Cassia angustifolia, Catharanthus roseus, Gloriosa superba, Coleus forskohlii, Stevia, Withania somnifera, Papaver somniferum, Plantago ovata, Dioscorea sp; Prospects in breeding of medicinal crops, viz. Chlorophytum sp, Rauvolfia serpentina, Aloe vera, Ocimum sp, Phyllanthus amarus, Solanum s; Prospects in breeding of aromatic crops viz., Geranium, vettiver, Lemon grass, Palmarosa, citronella, Rosemary, Patchouli, Eucalyptus, Artemisia and Mint.

Unit 6. PROCESSING OF PLANTATION CROPS, SPICES, MEDICINAL AND AROMATIC PLANTS

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, safed musli, 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. Study of aroma compounds and value addition. Nano-processing technology in medicinal and aromatic plants.

Unit 7. ORGANIC SPICE AND PLANTATION CROP PRODUCTION TECHNOLOGY

Importance, principles, perspective, concept and component of organic production of spice and
plantation crops; organic production of spice crops and plantation crops, viz. Pepper, cardamom, turmeric, ginger, cumin, vanilla, coconut, coffea, cocoa, tea, arecanut; managing soil fertility, pests and diseases and weed problems in organic farming system; crop rotation in organic horticulture; processing and quality control for organic foods; methods for enhancing soil fertility, mulching, raising green manure crops. Indigenous methods of compost, panchagavyya, biodynamics, preparation etc.; pest and disease management in organic farming; it’s in organic farming. Role of botanicals and bio-control agents; gap and gmp-certification of organic products; organic production and export - opportunity and challenges.