

Syllabus of Entrance Examination for Doctoral Degree Programme -2024-25 Uttar Banga Krishi Viswavidyalaya

1. Course Title : Systematics of Ornamental Plants

Block I:	Nomenclature
Unit I:	Nomenclature: History, origin, hotspots, classification and nomenclature systems.
Unit II:	International systems: International Code, Treaties, International and National Organisations, Biodiversity Act, Identification features, descriptors.
Unit III:	Red Book, Registration (NBPGR, PPVFRA, NBA).
Block 2:	Families
Unit I:	Families: Description and families and important genera Rosaceae, Asteraceae, Caryophyllaceae, Orchidaceae, Aracaceae, Liliaceae
Unit II:	Acanthaceae, Palmaceae, Asparagaceae, Malvaceae, Musaceae, Oleaceae, Iridaceae.
Block 3:	Molecular techniques
Unit I:	Molecular techniques in modern systematics.

2. Course Title : Breeding of Ornamental Crops

Block 1: Principles of Plant Breeding

Unit I: Principles of plant breeding: Principles of plant breeding; Origin, evolution, distribution, introduction, domestication and conservation of ornamental crops.

Unit II: Intellectual Property and Plant Breeders Rights: Introduction and initiatives in IPR and PBR of ornamental crops.

Unit III: Genetic mechanisms and inheritance: Breeding objectives, reproductive barriers (Male sterility, incompatibility) in major ornamental crops. Inheritance of important traits, Genetic mechanisms associated with flower colour, size, form, doubleness, fragrance, plant architecture, post-harvest life, abiotic and biotic stress tolerance/resistance.

Block 2: Breeding methods

Unit I: Breeding methods: Breeding methods suitable for sexually, asexually propagated flower crops, self and cross-pollinated crops - pedigree selection, backcross, clonal selection, polyploidy and mutation breeding, heterosis and F₁ hybrids.

Unit II: Role of biotechnology: Role of biotechnology in improvement of flower crops including somaclonal variation, *in-vitro* mutagenesis, *in-vitro* selection, genetic engineering, molecular markers, etc.

Crops

Rose, chrysanthemum, carnation, gerbera, gladiolus, orchids, anthurium, lily, marigold, jasmine, tuberose, dahlia, gaillardia, crossandra, aster, etc., Flowering annuals: petunia, zinnia, snapdragon, stock, pansy, calendula, balsam, dianthus, etc. Important ornamental crops like aglaonema, diffenbachia, hibiscus, bougainvillea, kalanchoe, etc.

3. Course Title : Commercial Production of Cut Flowers

Block 1: Production management

Unit I: Scope and scenario: National and International scenario, importance and scope of cut flower trade, constraints for cut flower production in India.

Unit II: Growing environment: Soil analysis, soil health card, Growing environment, open cultivation, protected cultivation, soil/medium requirements, land preparation, planting methods, influence of light, temperature, moisture, humidity and microclimate management on growth and flowering.

Unit III: Crop management: Commercial Flower production – Commercial varieties, water and nutrient management, fertigation, weed management, crop specific practices, ratooning, training and pruning, pinching, deshooking, bending, desuckering, disbudding. Use of growth regulators, physiological disorders and remedies, IPM and IDM.

Unit IV: Flower regulation: Flower forcing and year round/ off season flower production through physiological interventions, chemical regulation, environmental manipulation.

Block 2: Post-harvest management and marketing

Unit I: Post harvest management: Cut flower standards and grades, harvest indices, harvesting techniques, post-harvest handling, Methods of delaying flower opening, Pre-cooling, pulsing, packing, storage and transportation.

Unit II: Marketing: Marketing, export potential, institutional support, Agri Export Zones, 100% Export Oriented units, Crop Insurance.

Crops

Rose, chrysanthemum, gladiolus, tuberose, carnation, gerbera, orchids, lily, anthurium, china aster, alstroemeria, bird of paradise, heliconia, alpinia, ornamental ginger, dahlia, gypsophila, solidago, limonium, stock, cut greens and fillers.

4. Course Title : Commercial Production of Loose Flowers

Block 1: Production management

Unit I: Scope and scenario: Scope, scenario and importance of loose flowers, constraints and opportunities in loose flower production.

Unit II: Growing environment: Nursery management, pro-tray nursery under shade nets, soil and climate requirement, Field preparation, systems of planting.

Unit III: Crop management: Soil analysis, soil health card, water and nutrient management, weed management, training and pruning, special horticultural practices such as pinching and disbudding, use of growth regulators, physiological disorders and remedies, INM, IPM and IDM.

Unit IV:

Crop regulation: Flower forcing and year round flowering, production for special occasions through physiological interventions, chemical regulation.

Block 2: Postharvest management and marketing

Unit I: Postharvest management: Harvest indices, harvesting techniques, post-harvest handling and grading, pre-cooling, packaging and storage.

Unit II: Marketing: Important local markets, Export potential, transportation and marketing, APMC and online trading, institutional support, Crop Insurance.

Crops

Rose, jasmine, chrysanthemum, marigold, tuberose, china aster, crossandra, gaillardia, spider lily, hibiscus, nerium, barleria, celosia, gomphrena, Madar (*Calotropis gigantea*), nyctanthes (Harsingar), tabernaemontana (Chandni), lotus, water lily, michelia (Champa), gardenia, ixora and balsam.

5. Course Title : Ornamental Gardening and Landscaping

Block 1: Gardens and components

Unit I: Styles and types of gardens: Historical background of gardening, Importance and scope of ornamental gardening, styles and types of gardens, formal and informal style gardens. English, Mughal, Japanese, Persian, Spanish, Italian, French, Hindu and Buddhist gardens.

Unit II: Garden components: Garden components (living and non-living): arboretum, shrubbery, fernery, palmatum, arches and pergolas, edges and hedges, climbers and creepers, cacti and succulents, herbs, annuals, flower borders and beds, ground covers, carpet beds, colour wheels, clock garden, bamboo groves, bonsai; Non-living components like path, garden gate, fencing, paving and garden features like fountains, garden seating, swings, lanterns, basins, bird baths, sculptures, waterfalls, bridge, steps, ramps, Lawn - genera and species, establishment and maintenance.

Unit III: Specialized gardens: Specialised gardens such as vertical garden, roof garden, terrace garden, water garden, sunk garden, rock garden, shade garden, temple garden, sacred gardens (with emphasis on native plants), Zen garden.

Block 2: Landscape planning

Unit I: Principles and elements of landscaping: Basic drawing skills, use of drawing instruments garden symbols, steps in preparation of garden design, programme phase, design phase, etc. Elements and principles of landscape design. Organization of spaces, visual aspects of plan arrangement - view, vista and axis. Principles of circulation, site analysis and landscape, water requirement, use of recycled water.

Unit II: Landscaping for different situations: Urban landscaping, Landscaping for specific situations such as residential, farm houses, institutions, corporate sector, industries, hospitals, roadsides, traffic islands, Children parks, public parks, Xeriscaping, airports, railway station and tracks, river banks and dam sites and IT/ SEZ parks. Bio-aesthetic planning, eco-tourism, theme parks, indoor gardening, therapeutic gardening.