

**BABASAHEB BHIMRAO AMBEDKAR UNIVERSITY**

**B. VOC IN FLORICULTURE AND LANDSCAPE GARDENING**

**Eligibility of Admission** : Intermediate Agriculture/ Science in any Stream  
**Number of Seats** : 50  
**Name of Stream** : Floriculture and Landscape Gardening (3 year course)

<b>1<sup>st</sup> SEMESTER</b>		
<b>Course Code</b>	<b>Course Title</b>	<b>Credit</b>
FLG101	Introduction to Horticulture	6
FLG102	Propagation Techniques in Floriculture	4
FLG103	Nursery Management	4
FLG104	Indoor Gardening	6
FLG-105	Principal of Horticulture	4
MPDC-105	Remedial Language Course	1
<b>Total Credit</b>		<b>24 + 1</b>
<b>2<sup>nd</sup> SEMESTER</b>		
<b>Course Code</b>	<b>Course Title</b>	<b>Credit</b>
FLG 201	Professional Communication	4
FLG 202	Commercial Flower Production	6
FLG 203	Environment Management	6
FLG-204	Minor Project-I	4
FLG-205	Hi-tech Horticulture	4
MPDC-205	Moral Studies	1
<b>Total Credit</b>		<b>24 + 1</b>
<b>3<sup>rd</sup> SEMESTER</b>		
<b>Course Code</b>	<b>Course Title</b>	<b>Credit</b>
FLG 301	Commercial Cultivation of Orchids	6
FLG 302	Turf Grass Management	6
FLG 303	Production Techniques of Bulbous Crops	6
FLG 304	Arboriculture	6
MPDC-305	Community Service	1
<b>Total Credit</b>		<b>24 + 1</b>
<b>4<sup>th</sup> SEMESTER</b>		
<b>Course Code</b>	<b>Course Title</b>	<b>Credit</b>
FLG 401	Commercial Nursery Production	6
FLG 402	Landscape Gardening	6
FLG 403	Computer Skills	6
FLG 404	Container Gardening	6
MPDC-405	Ambedkar Studies	1
<b>Total Credit</b>		<b>24 + 1</b>
<b>5<sup>th</sup> SEMESTER</b>		
<b>Course Code</b>	<b>Course Title</b>	<b>Credit</b>
FLG 501	Industrial Internship/Dissertation	18
FLG 502	Minor Project-II	6
<b>Total Credit</b>		<b>24</b>
<b>6<sup>th</sup> SEMESTER</b>		
<b>Course Code</b>	<b>Course Title</b>	<b>Credit</b>
FLG 601	Seminar & Presentation	6
FLG 602	Techniques In Organic Floriculture	6
FLG 603	Disease and Pests of Floriculture Crops	6
FLG 604	Protected Cultivation of Floricultural Crops	6
<b>Total Credit</b>		<b>24</b>
<b>* Students shall have to qualify all MPDC paper during the course of study</b>		

## **COURSE NAME: INTRODUCTION TO HORTICULTURE**

**BOVCFLG-101**

**Credit: (4+2) = 6**

### **Theory:**

1. Scope and Importance of Horticulture, Global scenario, Problems and prospects of Horticulture with special reference to the Indian economy
2. Soils and soil management practices in Horticultural crops,
3. Irrigation and Fertilizers Management in Horticultural Crops, Organic Horticulture
4. Propagation techniques in Horticultural crops viz. cutting, layering, banding, grafting, micropropagation etc.
5. Introductory concepts of components of hi-tech horticulture
6. Post harvest management in Horticultural crops.

### **Practical:**

Identification of fruit, vegetable and flower crops, Irrigation and Fertilizer Management scheduling, Propagation techniques in Horticultural crops, Plant protection techniques in horticultural crops, Post harvest management techniques viz., grading, precooling, pulsing, waxing, storage, packaging etc. in Horticultural crops

### **Suggested Readings:**

Acquaah, G. *Principles & Practices of Horticulture*.

Chadha, KL. (Eds.). 2002. Hand Book of Horticulture. ICAR.

Chadha KL & Pareek OP. 1996. (Eds.). Advance in Horticulture. Vol. I. Malhotra Publ. House.

Janick J. 1986. Horticultural Science. Published by Freeman, W.H. & Company

फल विज्ञान, डॉ० राम नाथ सिंह

Basic of Horticulture by K.V. Peter

Practical Manual in Horticulture by Gauri Shanker

## **COURSE NAME: PROPAGATION TECHNIQUES IN FLORICULTURE**

**BOVCFLG-102**

**Credit: (4+2) = 6**

### **Theory**

#### **Unit I**

Basic concept and principles of plant propagation: cellular basis for propagation, types of propagation, advantages and disadvantages and asexual propagation seed germination and viability etc.

#### **Unit II**

Sexual method of propagation: Seed propagation, germination of seeds, Seed dormancy (scarification & stratification) internal and external factors and viability, Seed production- method of collection, processing, etc. Hybrid seed production, Seed treatment, classes of seed, Seed testing, commercial flower seed production.

#### **Unit III**

Vegetative propagation - importance, advantages, disadvantages, types of cuttings, budding, layering and grafting.

#### **Unit II**

Techniques of propagation through specialized organs, bulbs, corm, tuber, rhizome, runners, suckers, stolons, offsets, rooted crowns and divisions.

#### **Unit IV**

Selection and maintenance of mother trees, collection of scion wood stick, scion-stock relationship, and their influences, bud wood certification

#### **Unit V**

Micro- propagation-principles, concepts and techniques commercial exploitation in floriculture crops, Plant bio-regulators in propagation.

**Practical:** Tools and equipments used in plant propagation techniques, seed sowing, seed germination and viability tests, hands on cutting of ornamental plants, practices on vegetative propagation through layering, budding and grafting of ornamental plants, propagation of succulents, Hardening- case studies, use of plant bioregulators in propagation. Visit to tissue culture labs and commercial nurseries.

### **Suggested Readings:**

1. "Udyan Vigyan" – Shyam Sundar Shrivastava, Central Book House, Sadar Bazar, Raipur. (*in Hindi*)
2. Plant propagation: principles & Practices-Hartman H.T. & D.E. Kester, Prentice Hall of India, New Delhi.
3. Propagation of Tropical and Subtropical crops –Bose, T. K., Nayaprakash Calcutta-6.

## **COURSE NAME: NURSERY MANAGEMENT**

**BOVCFLG-103**

**Credit: (4+2) = 6**

### **Theory**

#### **Unit I**

Introduction to nursery: Basic concept and principles of nursery and its managements.

#### **Unit II**

Layout and management of commercial nursery: Nursery- site selection, layout, records, potting, repotting, Progeny orchard.

#### **Unit III**

Nursery (tools and implements), Propagation Structures: Mist chamber, humidifiers, greenhouses, glasshouses, cold frames, hot beds, poly-houses,

#### **Unit IV**

Nursery management of major crops, Problems in nursery management and its control, Insect/pest/disease control in nursery.

#### **Unit V**

Nursery accreditation and certification.

### **Practical:**

Media for propagation of plants in nursery beds, pot and mist chamber. Preparation of nursery beds and sowing of seeds. Raising of rootstock. Seed treatments for breaking dormancy. Preparation of plant material for potting. Hardening plants in the nursery. Practicing different types of cuttings, layering, graftings and buddings. Preparation of plant growth regulators for seed germination and vegetative propagation. Visit to a tissue culture laboratory. Digging, labeling and packing of ornamental plants. Use of different types of nursery tools and implements. Nutrient and plant protection applications during nursery.

### **Suggested Readings:**

1. "Udyan Vigyan" – Shyam Sundar Shrivastava, Central Book House, Sadar Bazar, Raipur. (*in Hindi*)
2. Plant propagation: principles & Practices-Hartman H.T. & D.E. Kester, Prentice Hall of India, New Delhi.

## **COURSE NAME: INDOOR GARDENING**

### **BOVCFLG-104**

**Credit: (3+1) = 4**

#### **Unit I**

Introduction to Indoor Gardening/indoor plantscaping. Origin and history of indoor gardening; Importance and scope of house plants and interior scaping, Plant-human relationships. Physical, emotional and environmental justification for indoor plantscaping for health Principles of interiorscaping and Design considerations.

#### **Unit II**

Plants used in interiorscapes; Method of growing indoor plants; soil, climate, water, Nutrient, potting, repotting, pinching, training, pruning, cleaning etc. plant growth and plant growth control.

#### **Unit III**

Environmental factors limiting plant growth and maintenance indoors. light: intensity, duration, source, effects, modifications, temperature, humidity, air movement and quality, water: quality, quantity, methods of application, waterproofing, growing media and nutrients.

#### **Unit IV**

Selection and maintenance considerations; living walls, Environmental monitoring, equipment, plant pruning, grooming, girdling roots, potting, replacement, rotation, seasonal flowering plants, maintenance schedules; Plant problem diagnosis. Recognition, prevention and control of common cultural, disease and insect problems on indoor plants with emphasis on integrated pest management practices for indoor plantscaping.

#### **Practicals**

Identification and description of ornamental plants for interiorscaping; Garden implements and their uses; Potting, repotting and planting; Miniature, bowl or dish garden or terrarium making; Dry flower decoration; Identification and control of various indoor plant diseases; Project preparation on indoor gardening

#### **Suggested Readings:**

1. The Houseplant Expert, by: Dr. D.G. Hessayon
2. **The Houseplant Encyclopedia by: Ingrid Jantra and Ursula Kruger**
3. Jurenka, N. A. and R. J. Blass. Cultivating a Child's Imagination Through Gardening. 1966. Teachers Ideas Press. Englewood, CO.
4. Arora J S ( 1990). Introductory Ornamental Horticulture, Kalyani Publication.
1. Bose T K and Mukerjee D 1987, Gardening in India, Oxford Book House.

**Unit-I**

Definition of Horticulture, Importance of horticulture in terms of economy, production, employment, generation, environmental protection and human resource development, Scope for horticulture in India. Divisions of horticulture with suitable examples and their importance, Classification of horticulture crops based on soil and climatic requirements. Fruit and Vegetable zones of India.

**Unit – II**

Definition of a nursery, Different types of nursery beds – flat beds, raised beds and sunken beds, their merits and demerits, Different nursery techniques and their management, Vegetable gardens, nutrition and kitchen garden, truck garden, Vegetable forcing, market gardens and roof gardens, Different steps in planning and layout establishment and management of orchards, hexagonal and contour systems of planting – their merits and demerits Calculation of planting densities in different systems of planting.

**Unit – III**

Pruning: Definition, objectives, Principles and methods of pruning, Training: Definition, objectives, Principles and methods of training: Open centre, Closed centre and Modified leader systems, their merits and demerits, Bearing habits in horticultural crops, Irrigation: definition, different methods of irrigation followed in horticultural crops, their merits and demerits, Manures and fertilizers: Definition, different methods of application of manures and fertilizers to horticultural crops.

**Unit- IV**

- I. Propagation: Definition, Methods, Sexual and asexual, advantages and disadvantages of each method, asexual method of propagation, propagation by division and separation.
- II. Propagation by cuttings: Definition of cutting, Different methods of cuttings, semi hard wood, soft wood and herbaceous stem cuttings, examples for each type; Leaf cuttings.
- III. Plant propagation by layering: Definition of layering and layer; Types of layering : Ground layering – Tip layering, Simple layering, Trench layering, Mound or Stool layering and Compound or Serpentine layering, examples for each type; Air layering examples.
- IV. Plant propagation by grafting: Definition; methods of grafting: Attached scion methods of grafting, Simple inarching or approach grafting; Detached scion methods of grafting: Pre-curing of scion, Side grafting methods: Veneer grafting, Apical grafting methods, Epicotyle grafting, Soft wood grafting, Double working, Top working. Plant propagation by budding: Definition of budding; Methods of budding: T- budding and Inverted T- budding, patch budding and ring budding.
- V. Role of PGR on propagation.

**Practicals:**

Study of tools and implements in horticulture, Layout of different planting systems, Layout of nutrition garden, Preparation of nursery beds for sowing of vegetable seeds, Digging of pits for fruit plants, Preparation of fertilizer mixtures and field application, Identification and management of nutritional disorders in vegetables, Study and practicing of different propagation methods by cutting, layering, division, Study and practicing of different propagation methods by grafting and budding

**Suggested Readings:**

1. Fundamentals of Horticulture, Edmond, J.B., Sen., T.L., Andrews, F.S and Halfacre R.G, 1963. Tata McGraw Hill Publishing Co., New Delhi.
2. Introduction to Horticulture, Kumar, N. 1990. Rajyalakshmi Publications, Nagarcoil, Tamilnadu.
3. Basic Horticulture, Jitendra Sing, 2002. Kalyani Publishers, Hyderabad.
4. Fundamentals of Fruit Production, Garner V R, Bradford F C and Hooker Jr. H D, 1957. McGraw Hill Book Co., New York.
5. Plant Propagation. Principles and Practices, Hartman, HT and Kester, D.E.1976, Prentice Hall of India Pvt. Ltd. Bombay.
6. Plant Propagation. Sadhu, M.K. 1996. New Age International Publishers, New Delhi.
7. Propagation of Fruit Crops, Mukherjee, S.K. and Majumdar, P.K.1973. ICAR, New Delhi.
8. Propagation of Tropical Fruit Trees, Ganner, R.J. and Choudari, S.A. 1972. Oxford & IBH Publishing Co., New Delhi.
9. Propagation of Horticultural Crops: Principles and Practices, Sarma, R.R. 2002. Kalyani Publishers, New Delhi

**Theory:**

**UNIT-I Communication skills & Etiquette**

Pronunciation & neutral accent, Tone of communication, Fluency in communication, Accuracy in communication, Making a presentation, E-mail etiquette, Interpersonal communication, Conflict management.

**UNIT-II: Time Management**

Time quadrant, Importance of planning, Making & maintaining a schedule, Managing a limited resource.

**UNIT-III: Non-Verbal Communication (Body Language)**

Handling perceptions, communicating beyond words, Sending positive nonverbal message

**UNIT-IV: Professionalism**

Punctuality, Respecting company culture, Culture sensitivity, Personal space, Maintaining a professional image.

**UNIT-V: Team Spirit**

SWOT, Recognizing a team's strength & weaknesses, Team building, recognizing your role in a team

**UNIT-VI: Presentation Skills**

Features of presentation, making a block buster presentation, Presentation –Real play & Evaluation

**Practicals:**

Communication skills & etiquette, Time Management, Non-verbal communication (Body Language), Professionalism, Team Spirit, Presentation skills.

**Suggested Readings:**

## **COURSE NAME: COMMERCIAL FLOWER PRODUCTION**

**BVOCFLG-202**

**Credit: (4+2) = 6**

### **Theory :**

1. Problems and prospects of floriculture industry with special reference to international trade
2. Origin, history and taxonomy of flower crops like rose, gladiolus, tuberose, chrysanthemum, carnation, gerbera, anthurium, orchid, lily, dahlia, marigold, seasonal flowers, cut foliage. Identification of ornamental flowering & foliage trees, herbs, shrubs, climbers and annuals.
3. Propagation and agro techniques for flower crops like rose, gladiolus, tuberose, chrysanthemum, carnation, gerbera, anthurium, orchid, lily, dahlia, marigold, seasonal flowers, cut foliage and fillers, cascade, bottom pot pocon etc.
4. Cultural requirements Crop physiology of flower crops like rose, gladiolus, tuberose, chrysanthemum, carnation, gerbera, anthurium, orchid, lily, dahlia, marigold, seasonal flowers, cut foliage and fillers, etc.
5. Good agricultural practices in floriculture crops, Value addition: Extraction and purification of essential oils, perfumes, (GAP) dehydration of flower and floral craft, cascade, pot pourri, buttons etc.

### **Practical:**

Botanical description of varieties, propagation techniques, training and pruning, drip and fertigation, foliar nutrition, growth regulator application, pinching, disbudding, staking, harvesting techniques, post-harvest handling, project preparation for regionally important cut flowers, visit to commercial cut flower units and case study.

### **Suggested Readings:**

Arora, JS. 2006. Introductory Ornamental Horticultural. Kalyani.  
Bhattacharjee, SK. 2006. Advances in Ornamental Horticulture. Vols. I-VI. Pointer Publ.  
Bose, TK. Maiti RG, Dhua RS & Das P. 1999. Floriculture and Landscaping. Naya prokash.  
Chadha, KL. 1995. Advances in Horticulture. Vol. XII. Malhotra Publ. House.  
Chadha, KL & Chaudhury B. 1992. Ornamental Horticulture in India. ICAR .  
Randhawa, GS & Mukhopadhyaya, A. 1986. Floriculture in India. Allied Publ.  
Reddy, S. Janakiram, B. Balaji, T. Kulkarni, S & Misra, RL. 2007. High-techFloriculture. Indian Society of ornamental Horticulture, New Delhi.  
Pal, B. P., Rose of India by ICAR  
Garden Flower by Vishnu Swaroop  
Indoor Gardening by Vishnu Swaroop  
Complete book of roses by Bhattacharjee, S. K. & Banerjee, B. K. (2010) published by Aniskar Publisher, Jaipur



## **FLG-203: Environment Management (Credit-6)**

### **UNIT-I**

Basic concept of environment, definition, scope, importance, components of environment, natural resources, biodiversity, ecosystem.

### **UNIT-II**

Environmental problems, pollutions, toxicity, climate change, Carbon sequestration

### **UNIT-III**

Classification of Horticultural Crops on the basis of environmental adaptability (light, water, air etc.)

### **UNIT-IV**

Management of environment –land use pattern, waste land, grass land, environmental laws and acts, waste management with special reference to agriculture, role of ornamental crops for improvement of environment and society.

### **Practical**

Classification of crops on basis of temperature, light, water requirement. Model preparation for various environment friendly ornamental gardening, listing of suitable crops for indoor and outdoor gardening. Layout of various ecosystem. Practical knowledge on environment management.

## **FLG-205 Hi-tech Horticulture 4Cr (3+1)**

### **Theory:**

Introduction & Importance, Nursery Management and mechanization, micro propagation of horticultural crops, Modern field preparation and planting methods, protected cultivation advantages, controlled conditions methods and techniques, micro irrigation systems and its components: EC, pH based fertilizers scheduling, canopy management, high density orcharding, components of precision farming, remote sensing, geographical information system (GIS), Differential Geo-positioning System (DGPS), Variable Rate applicator (VRA), Application of precision farming in horticultural crops (fruits, vegetables and ornamental crops), mechanized harvesting of produce.

### **Practicals:**

Types of polyhouses and shade net house, intercultural operations, tools and equipments identification and application, Micro-propagation, Nursery Protrays, Micro-Irrigation, EC, pH based fertilizers scheduling, canopy management, visit to hi-tech orchard/nursery.

### **Suggested Readings:**

Bhattacharjee SK. 2006. Advances in Ornamental Horticulture. Vols. I-VI. Pointer Publ.

Bose TK & Yadav LP. 1989. Commercial Flowers. Naya prokash.

Bose TK, Malti RG, Dhua RS & Das P. 1999. Floriculture and Landscaping. Naya Prokash.

Chadha KL. 1995. Advances in Horticulture. Vol . XII. Malhotra Publ. House.

Lauria A & Victor HR. 2001. Floriculture –Fundamentals and practices Agrobios.

Nelson PV. 1978. Green House Operation and Management. Reston Publ. Co.

Prasad S & Kumar U. 2003. Commercial Floriculture. Agrobios .

Randhawa GS & Mukhopadhyay A, 1986. Floriculture in India. Allied Publ.

Reddy S, Janakiram B, Balaji T, Kulkarni S & Mishra RL. 2007. High-tech Floriculture. Indian Society of Ornamental Horticulture, New Delhi.

## **COURSE NAME: COMMERCIALCULTIVATION OF ORCHAIDS**

**BVOCFLG-301**

**Credit: (4+2) = 6**

### **Unit I**

History of orchids in India. Classification of Orchids and their distribution.

### **Unit II**

Botany, Cultivation and Cultural practices of Orchids and aftercare, selection of places for growing orchids, soil, climate, watering, Nutrient management, Potting, Repotting.

### **Unit III**

Production management of tropical and subtropical orchids.

### **Unit IV**

Different orchid species and cultivars, important Hybrid varieties of orchids for commercial cultivation, protected cultivation of orchids.

### **Unit V**

Problems of orchid cultivation. Recognition, prevention and control of common cultural, disease, insect & pest

#### **Practical:**

1. Identification and enlisting various species, cultivars and hybrids of orchids.
2. Experiment to demonstrate the orchid cultivation, intercultural operations, potting, re-potting.
3. Study of disease, insect-pest and physiological disorders of orchids.
4. Visit to commercial orchidarium

#### **Suggested Readings:**

1. The Gardener's Guide to Growing Orchids (Brooklyn Botanic Garden All-Region Guide) by Charles Marden Fitch
2. The Best Orchids for Indoors (Brooklyn Botanic Garden All-Region Guide) by Charles Marden Fitch
3. Bloom-Again Orchids: 50 Easy-Care Orchids that Flower Again and Again and Again by judywhite
4. Growing Orchids IV: The Australasian Families (Growing Orchids, Book 4) by J. N. Rentoul
5. Encyclopaedia of Cultivated Orchids. An Illustrated, descriptive manual of the members of the orchidaceae currently in cultivation by Alex D Hawkes
6. Orchids by S. K. Mukherjee.

## **COURSE NAME: TURF GRASS MANAGEMENT**

**BVOCFLG-302**

**Credit: (4+2) = 6**

### **Unit I**

Plant morphology and specific structures that will enable them to identify the various species used as turf grasses.

### **Unit II**

The components of the environment (atmosphere, soil, biotic) and how they affect turfgrass growth and development.

### **Unit III**

Soil physical and chemical properties as related to turf grass management.

### **Unit IV**

What a fertilizer is and how it is used to achieve a high-quality turf. How the turf grass plant uses nutrients, and how fertilizers behave in soils. Emphasis is placed on ability to calculate and apply appropriate amounts of the chemical.

### **Unit V**

Fertilization, Mowing and Maintenance, Irrigation, Cultural Practices & Weed control methods

### **Unit VI**

Use of Machinery in Turf Grass Management.

### **Unit VII**

The basics of supplementary management practices, such as aerification, topdressing, and overseeding.

### **Practical**

A laboratory-based course for students to gain practical knowledge and experience in turfgrass information gathering, species identification, turf calculations, calibration of application equipment, equipment maintenance and troubleshooting, turfgrass establishment, and renovation.

### **Suggested Readings:**

Turgeon, A. J. *Turfgrass Management*, 8th Edition, Prentice Hall, Upper Saddle River, New Jersey

Arora JS. 2006. *Introductory Ornamental horticulture*. Kalyani.

Bhattacharjee SK. 2006. *Advances in Ornamental Horticulture*. Vols. I-VI. Pointer Publ.

Bose TK & Yadav LP. 1989. *Commercial Flowers*. Naya Prokash.

Bose TK, Maiti RG, Dhua RS & Das P. 1999. *Floriculture and Landscaping*. Naya Prokash.

Chadha KL & Chaudhury B. 1992. *Ornamental Horticulture in India*. ICAR.

Chadha KL. 1995. *Advances in Horticulture*. Vol. XII. Malhotra Publ. House.

## **COURSE NAME: PRODUCTION TECHNIQUES OF BULBOUS CROPS**

**BVOCFLG-303**

**Credit: (4+2) = 6**

### **Unit I**

Botany, Taxonomy and classification of bulbous plants, Different types of bulbous crops and their propagation techniques: Bulbs, Corms, Tubers, Rhizome

Package and practices for cultivation, soil, climate, watering, feeding, intercultural operations, Dormancy, weed control, physiological disorder, plant protection measures, harvesting, storage.

### **Unit II**

Bulbs: Tuberose, Lilly, Tulip, Narcissus

### **Unit III**

Corms: Gladiolus, Caladium, Package and practices for cultivation, soil, climate, watering, feeding, intercultural operations, Dormancy, weed control, physiological disorder, plant protection measures, harvesting, storage.

### **Unit IV**

Tubers: Alocacia, Dahlia, Begonia, Colacacia, Package and practices for cultivation, soil, climate, watering, feeding, intercultural operations, Dormancy, weed control, physiological disorder, plant protection measures, harvesting, storage.

### **Unit V**

Rhizome: Canna, Glorisa, Ware lily, Package and practices for cultivation, soil, climate, watering, feeding, intercultural operations, Dormancy, weed control, physiological disorder, plant protection measures, harvesting, storage.

### **Practical:**

1. Identification of commercially important bulbous crops and their varieties.
2. Propagation practices in bulbous crops
3. Practical cultivation of bulbous crops
4. Harvesting techniques of bulbous crops.
5. Storage of bulbs, corm, rhizome, tubers for further multiplication

### **Suggested Readings:**

1. The Bulb Expert by: Hessayon, D.G. (1999). London: Transworld Publishers.
2. The Larger Bulbs by: Mathew, Brian (1978). London: B.T. Batsford (in association with the Royal Horticultural Society).
3. Bulbs by: Phillips, R. & Rix, M. Pan Books.
4. Rix, Martyn (1983). Growing Bulbs. Portland, Oregon: Timber Press.
5. Gardening with Bulbs by: Taylor, P. (1996). . London: Pavillion Books.
6. Arora J S ( 1990). Introductory Ornamental Horticulture, Kalyani Publication
7. Bose T K and Mukerjee D 1987, Gardening in India, Oxford Book House.

## **COURSE NAME: ARBORICULTURE**

**BVOCFLG-304**

**Credit: (4+2) = 6**

### **UNIT I:**

Scope of arboriculture- Tree forms, shapes and architecture-arboriculture for soil improvement and soil conservation, for domestic and industrial produces, trees and environmental pollution control abatement- arboriculture for employment generation.

### **UNIT II:**

Avenue planting of trees species selection and planting methods, shade, water and nutrient management sprayers and dusters low volume and high volume sprayers, vapourizers, aerosols.

### **UNIT III:**

Planting and management of timber, ornamental flowering and foliage trees, multipurpose, medicinal and fruit trees, Designing and landscaping of parks and other public areas-landscaping with trees-principles and practices Social awareness and social concern of tree planting.

### **UNIT IV:**

Ashok, Temple tree, Jacranda, Cassia *sp.*, Lagerstomia and Delonix regia Tamarind, Mahua, Jamun, Mango, Coconut palm and Betal Nut Palm *etc.*

### **Practical:**

Visit to arboretums and botanical gardens maintained by various institutes-Study the different forms and shapes of trees, explain tree architecture-make diagrams and sketch, study the role of trees in environmental amelioration.

### **Suggested reading**

Ahuja, M.R and Libbey, W.J 1993. Clonal Forestry. Springer-Verlag, London

Doornbos, M., Saith, A and White, B. 2000. Forest – Nature, People, Power. Blackwell Publishers, Massachusetts, USA.

James, N.D.G. 1989. The Arboriculturists Companion. Basel Blackwell Ltd. Oxford.

Sagwal, S.S. 1994. Trees on Marginal Hands. Scientific Publishing Company, Jodhpur.

Randhawa M.S. 2005. Flowering trees. National Book Trust, India.

Santapau H. 2005. Common Trees. National Book Trust, India.

## **COURSE NAME: COMMERCIAL NURSERY PRODUCTION**

**BVOCFLG-401**

**Credit: (4+2) = 6**

### **UNIT I:**

Introduction, life cycles in plants, cellular basis for propagation, sexual propagation, apomixis, polyembryony, chimeras. Principles factors influencing seed germination of horticultural crops, dormancy, hormonal regulation of germination and seedling growth.

### **UNIT II:**

Asexual – sexual propagation, Techniques of seed production and handling in horticulture, Seedling production systems in nurseries, Types of grafts/ grafting systems, Production process of graftage/equipment, Propagation and nursery production of rootstocks – layering, Production programs related with spring/summer budding

### **UNIT III:**

Nursery site selection - physical properties of forest-nursery soils - soil fertility in forest nurseries - nursery soil organic matter - management and importance. Water management - irrigation systems - frost protection, controlling heat and seedling dormancy with irrigation, common drainage problems and their remedies- modern nursery design and layout.

### **UNIT IV:**

Micro-propagation – principles and concepts, commercial exploitation in horticultural crops. Techniques - in vitro clonal propagation, direct organogenesis, embryogenesis, micrografting, meristem culture. Hardening, packing and transport of micro-propagules.

### **UNIT V:**

Nursery – types, structures, components, planning and layout. Nursery management practices for healthy propagule production.

### **UNIT VI :**

Basics of greenhouse design, different types of structures – glasshouse, shade net, poly tunnels - Design and development of low cost greenhouse structures.

### **Practical**

Introduction and identification of modern equipments and tools used in nursery. Preparation of nursery beds and growing media for containerized nursery. Hardening – case studies, micropropagation, explant preparation, media preparation, culturing – in vitro clonal propagation, meristem culture, shoot tip culture, axillary bud 15 culture, direct organogenesis, direct and indirect embryogenesis, micro grafting, hardening. Visit to nurseries.

### **Suggested Readings**

Hartmann HT & Kester DE. 1989. Plant Propagation – Principles and Practices. Prentice Hall of India.

Bose TK, Mitra SK & Sadhu MK. 1991. Propagation of Tropical and Subtropical Horticultural Crops. Naya Prokash.

Peter KV. (Ed.). 2008. Basics of Horticulture. New India Publ. Agency.

Singh SP. 1989 Mist Propagation. Metropolitan Book Co.

## **COURSE NAME: LANDSCAPE GARDENING**

**BVOCFLG-402**

**Credit: (4+2) = 6**

### **Theory**

#### **Unit I**

History, importance and scope of gardening. Landscaping – definition, historical background, design, basic principle and components

#### **Unit II**

Bio-aesthetic planning - definition, need, rural country planning; Urban landscaping - planning and planting avenues, schools, villages, beautifying railway stations, dam sites, hydroelectric stations, colonies, river banks, planting material for play grounds.

#### **Unit III**

Garden and its components, adornments, description and design of garden structures; styles of garden – Formal & Informal; Types of gardens – Persian gardens, Mughal gardens, English gardens, French gardens, Spanish gardens, Japanese gardens.

#### **Unit IV**

Popular gardens in India, Special types of gardens – Temple garden, Healing/Therapeutic garden, water garden, Vertical gardens, roof gardens, terrace garden, Rock garden (methods of designing rockery, layout of rockery), Clock garden, moonlight garden, garden for blind persons, bog garden, sunken garden, miniature garden, Table garden, dish/bowl or bottle garden, terrariums, window garden, indoor gardens, Parks and public gardens, etc.

#### **Unit V**

Lawn establishment and maintenance; Flower arrangement; Culture and art of making bonsai.

**Practical:** Identification and description of annuals, herbaceous, perennials, climbers, creepers, foliage flowering shrubs, trees, palms, ferns, ornamental grasses; cacti & succulents; planting herbaceous and shrubby borders, planning and designing gardens, landscaping for specific areas, layout of formal gardens, informal gardens; lawn preparation and maintenance; flower arrangement; bonsai practicing and training; project preparation on landscaping for different situation and special type of gardens - miniature and table garden; visit to nearby parks and botanical gardens.

### **References:**

1. "Introductory Ornamental Horticulture" – Arora, J.S. 1998, *Kalyani Publishers, Ludhiana*.
2. "Commercial Flowers" – Bose, T.K. and L.P. Yadav (Eds) 1988. *Naya Prokash Calcutta*.
3. "Ornamental Horticulture" – Swarup, V. 1997. *Mac Millan, Indian Ltd. Delhi*.
4. "Progressive Floriculture" – Yadav, I.S. and M.L. Choudhary, 1997. *The House of Sarpan, Bangalore*.
5. "Udyan Vigyan" – Dr. Shyam Sundar Shrivastava, *Central Book House, Raipur. (in Hindi)*
6. "Floriculture in India" – G.S. Randhawa
7. Floriculture and Landscaping : T.K. Bose , R.G. Maiti, R.S. Dhua & P. Das. Naya Prakash, Calcutta.
8. Text book on Floriculture and Landscaping, N. Roy Choudhry & H.P. Mishra.



## **COURSE NAME- COMPUTER SKILLS**

**BVOCFLG-403**

**6 Cr (4+2)**

### **Objectives-**

To impart knowledge about the basics of computer and its uses in floriculture industry.

### **THEORY**

#### **UNIT 1**

Computer fundamentals; Definition and Characteristics of computers; Organization of computers; Computer Generations; Classifications of Computers; Importance in agri-horticulture.

#### **UNIT 2**

Hardware and software; Computer memory and permanent storage devices; Input and output devices

#### **UNIT 3**

Operating systems (OS) - definition, basic concepts and types; Internet and World Wide Web (WWW)- Concepts and components, HTML and IP.

#### **UNIT 4**

Data representation in Computer, Word, Power point, Excel, CAD in floriculture

### **PRACTICAL**

MS Word- Features of word processing, creating document and tables and printing of document, MS Excel- Concept of electronic spreadsheet, creating, editing and saving of spreadsheet, inbuilt statistical functions and formula bar, Analysis of data using MS Excel. MS Power point- preparation, presentation of slides and slide show. Web Browsing, Creation and operation of Email account, Designing of landscape etc in computer.

### **Suggested reading:**

1. Computer Fundamentals, by Anita Goel, PEARSON publication
2. Computer Fundamentals, by Priti Sinha, Pradeep K. Sinha, PBP Publications
3. Computer Fundamentals: Architecture and Organization, by [B. Ram](#), New Age International

## **COURSE NAME: CONTAINER GARDENING**

**BOVCFLG-404**

**Credit: (4+2) = 6**

### **THEORY**

#### **Unit I**

Principles of container gardening. Importance and scope of container gardening in India.

#### **Unit II**

Different types of containers used for growing plants, Care and maintenance of plants.

#### **Unit III**

Intercultural operations like selection of containers, soils, fertilizers, drainage, watering, potting, re-potting. Factors affecting growth and flowering of house plants.

#### **Unit IV**

Application of container gardening vertical gardening, roof gardening.

#### **Unit V**

Description and cultivation of various plants used for container planting. Care of plants in containers over their life span. Advantage and disadvantage of container gardening.

#### **Practical:**

1. Identification of plants suitable for different garden locations.
2. Soil tests: Types of soil, water holding capacity, field capacity, Electrical conductivity, pH.
3. Methods of Preparing different container and planting in them.
4. Different types of pots and potting medium
5. Garden tools and implements.
6. Study of irrigation techniques, drainage and water conservation.
7. Visual diagnosis of diseases, nutrient deficiencies and toxicity in the container.

#### **Suggested Readings:**

1. Arora J S ( 1990). Introductory Ornamental Horticulture, Kalyani Publication.
2. Bailey L H 1901. The Standard cyclopaedia of Horticulture, volume 1,2 and 3 Macmillan Publications.
3. Bose T K and Mukerjee D 1987, Gardening in India, Oxford Book House
4. Kumar N 1989 Introduction to Horticulture, Rajalakshmi Publications.
5. Manibhushan Rao 1991. Text book of Horticulture, Macmillan Publications.
6. Shujnrnoto, 1982. The Essentials of Bonsai, David & Charles, Newton.

## **COURSE NAME: TECHNIQUES IN ORGANIC FLORICULTURE**

**BVOCFLG-602**

**Credit: (4+2) = 6**

### **Objective:**

To develop understanding of organic floriculture production system including Good Agricultural Practices.

### **Theory:**

#### **UNIT I:**

Organic floriculture - definition, synonyms and misnomers, principles, methods, merits and demerits.

#### **UNIT II:**

Organic farming systems, components of organic floriculture systems, different organic input, their role in organic floriculture, role of Biofertilizers, biodynamics and the recent developments.

#### **UNIT III:**

EM technology and its impact in organic floriculture, indigenous practices of organic farming, sustainable soil fertility management, weed management practices in organic farming, biological/natural control of pests and diseases, organic horticulture in quality improvement.

#### **UNIT IV:**

GAP – Principles and management, HACCP exercise, certification of organic products and systems, agencies involved at national and international levels, standards evolved by different agencies.

#### **UNIT V:**

Constraints in certification, organic floriculture and exports, IFOAM and global scenario of organic movement, post-harvest management of organic produce.

### **Practical:**

Fertures of organics orchards, working out conversion plan, Input analysis- manures, nutrient status assessment of manures, biocomposting, Biofertilizers and their application, panchagavya preparation and other organic nutrients application, methods of preparation of neem products and application, BD preparation and their role, EM technology and products, biological/natural control of pests and diseases, soil solarisation, frame work for GAP, case studies, HACCP analysis, residue analysis in organic products, documentation for certification, visit to fields cultivated under organic practices.

### **Suggested Readings:**

Claude A, Vandana S, Sultana I, Vijaya L, Korah M & Bernard D. 2000. *The Organic Farming Reader*. Other Indian Press, Goa.

Gaur AC, Neblakantan S & Dargan KS. 1984. *Organic Manures*. ICAR.

Lampkin N & Ipswich. 1990. *Organic Farming*. Farming Press. London.

Lampkin NH & Padel S. 1992. *The Economic of Organic Farming-An International Perspective*. CABI.

Palaniappan & Annadural. 2008. *Organic Farming-Theory and Practise*. Scientific Publ.

Peter KV. 2008 (Ed.). *Basis of Horticulture*. New Indian Publ. Agency. New. Delhi.

Rao S. 1977. *Soil Microorganism and Plant Growth*. Oxford & IBH.

## **COURSE NAME: DISEASE AND PEST OF FLORICULTURE CROPS**

**BVOCFLG-603**

**Credit: (3+1) = 4**

### **Theory**

#### **UNIT I**

Biological Enemies of Horticultural Plants: Plant as pests – weeds, parasitic plants; Animal pests of plants – insects, pests and diseases of nursery and farm floriculture and ornamental plants. Assessment of losses due to insects – pests and diseases on ornamental plants and floricultural crops.

#### **UNIT II**

Principles and methods of Diseases and Pests control: Principles of pests control – Control strategies, classification of pesticides, growth regulators in pests control, choosing a pesticide, Integrated Pests Management; Biological, cultural, legislative, physical and mechanical control of pests – rationale of biological control, strategies of biological control, cultural control, legislative control, mechanical and physical control;

#### **UNIT III**

Chemical control of plant pests: insecticides and their uses, herbicides, classification of herbicides, formulations, methods of application, factors influencing herbicides effectiveness, indoor weed control, suggested herbicides for the landscape, suggested herbicides for the home garden;

Greenhouse pest control – common green house insects-pests, common green house diseases, control methods, control strategies, preventing greenhouse diseases.

#### **UNIT IV**

Important diseases and insects- pests of floricultural crops of economic importance - Rose, Gladiolus, Gerbera, Carnation, Orchids, Tuberose, Chrysanthemum, Anthurium, China Aster, Crossandra, Jasmine, Marigold.

#### **Practical:**

Identification and description of insects-pests and diseases important floricultural crops – Rose, Gladiolus, Gerbera, Carnation, Chrysanthemum, Jasmine, Tuberose, Anthurium, Lily, Orchids, Croton, Nerium; Application of pesticides and bio-control agents in the management of insect pests.

#### **Suggested Readings:**

1. Ornamental Horticulture by S.S. Sindhu
2. All About Roses by B.P. Pal
3. Roses in India by B.P. Pal
4. Ornamental Horticultural by Vishnu Swaroop
5. Flowers and Gardens by Wright
6. Garden Plants by T.K. Bose
7. Garden Flowers by Vishnu Swaroop
8. Floriculture and Landscaping by Bose, Maiti, Dhua and Das.

## **COURSE NAME: PROTECTED CULTIVATION OF FLORICULTURAL CROPS**

**BOVCFLG-604**

**Credit: (4+2) = 6**

### **Theory**

#### **UNIT I**

Prospects of protected horticulture in India; Types of protected structures-Greenhouse, poly house, shade houses, rain shelters etc. Low cost/Medium, cost/High cost structures, Location specific designs; Structural components; Suitable horticultural crops for protected cultivation.

#### **UNIT II**

Environmental control-management and manipulation of temperature, light, humidity, air and CO<sub>2</sub>, Heating and cooling systems, ventilation, naturally ventilated greenhouses, fan and pad cooled green houses, light regulation.

#### **UNIT III**

Containers and substrates, soil decontamination, layout of drip and fertigation system, water and nutrient management, weed management, physiological disorders, IPM and IDM under protected cultivation.

#### **UNIT IV**

Crop regulation by chemical methods and special horticultural practices (pinching disbudding, dishooting, deblossoming, etc.); Staking and netting, photoperiod regulation.

#### **UNIT V**

Harvesting techniques, post-harvest handling techniques, Economics of cultivation,

### **Practical**

Study of various protected structures, practices in design and layout of different types of structures, practices in preparatory operations, soil decontamination techniques, Practices in drip and fertigation techniques, special horticultural practices, determination of harvest indices and harvesting methods, postharvest handling, packing methods.

### **Suggested Readings**

Bhattacharjee SK. 2006. Advances in Ornamental Horticulture. Vols. I-VI. Pointer Publ.

Bose TK & Yadav LP. 1989. Commercial Flowers. Naya prokash.

Bose TK, Malti RG, Dhua RS & Das P. 1999. Floriculture and Landscaping. Naya Prokash.

Chadha KL. 1995. Advances in Horticulture. Vol . XII. Malhotra Publ. House.

Lauria A & Victor HR. 2001. Floriculture –Fundamentals and practices Agrobios.

Nelson PV. 1978. Green House Operation and Management. Reston Publ. Co.

Prasad S & Kumar U. 2003. Commercial Floriculture. Agrobios .

Randhawa GS & Mukhopadhyay A, 1986. Floriculture in India. Allied Publ.

Reddy S, Janakiram B, Balaji T, Kulkarni S & Mishra RL. 2007. High-tech Floriculture. Indian Society of Ornamental Horticulture, New Delhi.