DEPT. OF HORTICULTURE
# LIST OF NEW COURSES

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## 18HO2012 STUDY TOUR – I

### Credits 0:0:1

#### Course Objectives
- To be familiar with various horticultural institutions/ Research Stations/ Colleges in South India
- To be familiar with the ongoing horticultural research and extension programmes in various Horticulural Institutions/ Colleges of South India

#### Course Outcome
At the end of this course, the students will be able to
- Gain practical knowledge about horticultural crops and cropping systems in the different agro-climatic zones and horticultural crops in Tamil Nadu
- Learn social, cultural aspects of different agricultural zones in Tamil Nadu
- Identify and analyze different soil types and cropping systems for horticultural crops in Tamil Nadu

#### Course Content:
The study tour programme is of one week, during this period various Agricultural Research Stations, Institutions or Colleges will be visited. This is to get an exposure of various ongoing research and extension activities in different agro-eco systems in the State.

#### Evaluation and mark distribution
In the study tour programme, full attendance is mandatory for a pass as per the ICAR regulations.

The marks awarded as follows for the evaluation of the courses
- **Attendance and general behaviour** - 35
- **Report of the study tour** - 35
- **Exam (internal)** - 20
- **Viva** - 10
- **Total** - 100
18HO2013 PRINCIPLES OF ORNAMENTAL HORTICULTURE AND LANDSCAPE ARCHITECTURE

Credits 2:0:1

Course Objective
- To define scope and importance of ornamental horticulture and landscaping
- To familiarize with the different styles and designs of landscape architecture
- To learn about suitability of ornamental crops for different areas, cut flowers and floral arrangements
- To be able to use AutoCAD and ArchCAD for gardening and landscape designing

Course Outcome
At the end of this course, the students will be able to
- Remember the principles of landscape design
- Explain about the different ornamental crops and its landscape uses
- Develop knowledge about the crops suitable to different landscapes
- Discover different landscaping designs and architectures

Theory
History, definitions, scope, Importance, area and production, industrial importance of ornamental plants and flowers. Importance, classification, design values of ornamentals. Principles of Landscape gardens. Historical Importance of Indian gardens(English garden, Japanese gardens, Mughal gardens, French and Persian garden, Italian gardens, Hindu gardens and Buddhist gardens), Famous gardens of India and abroad, formal, informal, free style and wild gardens. Importance, design and establishment of garden features, bridges, paths, drives, fences, garden walls, gates, carpet bed, arbour, Patio, decking, retaining walls, shade garden, sunken garden, roof garden, terrace garden, pebble garden, rockery, pools, waterfalls, fountains, bog garden, avenue planting and children garden. Lawn types, establishment and maintenance. Importance of flower arrangement, Ikebana techniques and types, uses of vertical garden, bottle garden, terrariums, xeriscaping, bonsai making and maintenance. Use of Auto CAD and Arch CAD in designing gardens. Factors affecting landscape design. Bio-aesthetic planning. Planning and designing of different gardens.

Practical
Identification and description of annuals, biennials, herbaceous perennials, climbers, shrubs, trees, indoor plants, ferns. Palms, cycads, Cacti and succulents. Planning and designing and establishment of garden features viz. lawn, hedge, edge, rockery, water garden, carpet bedding, shade garden, roof garden, terrariums, vertical garden, study and practice of different types of flower arrangements, floral bouquets, floral rangoli, vent etc., Study of Bonsai techniques, Bonsai practicing and training. Visit to nurseries and floriculture units. Study of garden equipments and designing of different styles of garden. Designing gardens using Auto-cad/archi-cad, Designing gardens for home, traffic islands, schools and colleges, public buildings, factories, railway stations, air ports, temples, churches, play grounds, corporate buildings/malls. Visit to public, institutional and botanical gardens.

References:
18HO2014 DRYLAND HORTICULTURE

Credits: 2:0:1

Course Objectives
- To learn about techniques and management of dryland horticulture
- To learn about the various water conservation methods
- To learn about horticultural crops adapted for dryland cultivation and special cultivation techniques

Course Outcome
At the end of this course, the students will be able to
- Remember the present day water availability scenario
- Explain different water conservation techniques
- Gain knowledge on different crops suitable to dryland areas
- Identify different dryland farming techniques

Theory
Definition, importance and limitation of dry land horticulture, present status and future scope. Constraints encountered in dry lands. Agro-climatic features in rain shadow areas, scarce water resources, high temperature, soil erosion, run-off losses etc. Techniques and management of dry land horticulture. watershed development, soil and water conservation methods-terraces, contour bunds, etc. Methods of control and impounding of run-off water-farm ponds, trenches, macro catch pits, etc., in-situ water harvesting methods, micro catchment, different types of tree basins etc. Methods of reducing evapotranspiration, use of shelter belts, mulches, antitranspirants, growth regulators, etc. water use efficiency-need based, economic and conjunctive use of water, micro systems of irrigation etc. Selection of plants having drought resistance. Special techniques, planting and after care-use of seedling races, root stocks, in-situ grafting, deep pitting/planting, canopy management etc. Characters and special adaptation of crops: ber, aonla, annona, jamun, wood apple, bael, pomegranate, carissa, date palm, phalsa, fig, west Indian cherry and tamarind.

Practical

References

18HO2015 BREEDING OF FRUITS AND PLANTATION CROPS

Credits 2:0:1

Course Objectives
- To learn about fruit breeding and its importance in fruit production
- To be familiar with the various fruit crop improvement strategies
- To understand the breeding methods of important fruit and plantation crops

Course Outcome
At the end of this course, the students will be able to
• Remember the different breeding aspects in important fruit and plantation crops
• Explain about the different crop improvement strategies
• Develop knowledge about breeding methodologies of important fruit and plantation crops

Theory
Fruit breeding - History, importance in fruit production, distribution, domestication and adaptation of commercially important fruits, variability for economic traits, breeding strategies, clonal selection, bud mutations, mutagenesis and its application in crop improvement – policy manipulations – in vitro breeding tools (important fruit and plantation crops).

Practical
Exercises on floral biology, pollen viability; emasculation and pollination procedures; hybrid seed germination; raising and evaluation of segregating populations; use of mutagens to induce mutations and polyploidy in major crops like Mango, Banana, Citrus, Grapes, Guava, Sapota, Papaya, Custard apple, Aonla, Ber, Litchi, Pomegranate, Jamun, Arecanut, Coconut, Pistachonut, Apple, Pear, Plum, Peach, Apricot and Strawberry.

Reference:
References:

18HO2017 INSECT PESTS OF VEGETABLE, ORNAMENTAL AND SPICE CROPS

Credits 2:0:1

Course Objectives
- To learn about the insect pests of vegetable, ornamental and spice crops
- To study the ecology and integrated pest management strategies of important vegetable, ornamental and spice crops
- To assess damage, insecticidal residue, and tolerance limits of chemical pesticides in vegetable crops

Course Outcome
At the end of this course, the students will be able to
- Remember the major insect pests of vegetable, ornamental and spice crops
- Identify the different storage pests and their management
- Gain knowledge in Integrated Pest Management techniques of vegetable, ornamental and spice crops

Theory: Economic importance of insects in vegetable, ornamental and spice crops -ecology and pest management with reference to these crops. Pest surveillance in important vegetable, ornamental and spice crops. Distribution, host range, bio-ecology, injury, integrated management of important insect-pests affecting vegetable, ornamental and spice crops. Important storage insect pests of vegetable, ornamental and spice crops, their host range, bio-ecology, injury and integrated management. Insect –pests of processed vegetables and ornamental crops, their host range, bioecology, injury and integrated management. Insecticidal residue problems in vegetables and ornamental crops, tolerance limits etc.

Practical
Study of symptoms, damage, collection, identification, preservation, assessment of damage/ population of important insect-pests affecting vegetable, ornamental and spice crops in field and during storage.

References:

18HO2018 INTRODUCTION TO MAJOR FIELD CROPS

Credits 1:0:1

Course Objectives

- To learn about classification and distribution of field crops
- To learn about the various cropping systems and cultivation practices of major field crops
- To be familiar with fertilizer and herbicide application methods

Course Outcome

At the end of this course, the students will be able to

- Remember classification and distribution of major field crops
- Define and explain the concepts of multiple cropping, mixed cropping, intercropping, relay and alley cropping
- Gain knowledge about major field crops and cropping systems

Theory

Classification and distribution of field crops, definitions and concept of multiple cropping, mixed cropping, intercropping, relay and alley cropping, cultural practices for raising major cereals (rice), pulses (red gram), oil seeds (groundnut), sugar crops (sugarcane) and fodder crops, green manuring, crop rotation.

Practical

Identification of crop plants, seeds and weeds. Preparation of cropping scheme. Application of herbicides in field crops.

References:


18HO2019 ECONOMICS AND MARKETING

Credits: 2:0:1

Course Objectives

- To understand the concept of agricultural market structure and its classification
- To study the theories of demand and supply of agricultural produce in market-oriented economy
- To be familiar with marketing of agricultural produce and to prepare projects individually

Course Outcome

At the end of this course, the students will be able to

- Recall the concepts of agricultural marketing
- Understand about marketing margin and marketing functions
- Plan for proposing individual project in cost effective manner
Theory
Terms and definitions in Economics; Consumption, demand and supply. Factors affecting production. Gross Domestic Product (GDP) – Role of poultry sector in National GDP. Marketing- Definition, marketing process, need for marketing, role of marketing, marketing functions, classification of markets, marketing of various channels, price spread, marketing efficiency, integration, constraints in marketing of agricultural produce, market intelligence, bank norms, insurance, SWOT analysis, crisis management. Techno-economic parameters for preparation of projects and basic guidelines for preparation of project report.

Practical
Techno-economic parameters for preparation of project. Preparation of bankable projects for various agricultural products and its value-added products. Identification of marketing channel, calculation of price spread, identification of market structure and visit to different markets.

References

18HO2020 HORTI-BUSINESS MANAGEMENT

Credits: 2:0:0

Course Objectives
- To learn about farm and business management principles
- To study the concepts of economics, materials and operations management, inventory control and marketing management
- To learn about financial management, budgeting, and project management

Course Outcome
At the end of this course, the students will be able to
- Recall farm and business management concepts
- Understand forms of business management, operations and materials management, financial management, personnel management, and inventory control,
- Gain knowledge on planning marketing programmes, preparing financial statements, budgeting and project management

Theory
Farm management - definition, nature, characteristics and scope. Farm management principles and decision making, production function, technical relationships, cost concepts, curves and functions – factors, product, relationship – factors relationship, product relationship, optimum conditions, principles of opportunity cost-equi-marginal returns and comparative advantages, time value of money, economic of scale, returns to scale, cost of cultivation and production, break even analysis, decision making under risk and uncertainty. Farming systems and types. Planning – meaning, steps and methods of planning, types of plan, characteristics of effective plans. Organizations – forms of business organizations, organizational principles, division of labour. Unity of command, scalar pattern, job design, span of control responsibility, power authority and accountability. Direction – guiding, leading, motivating, supervising, coordination – meaning, types and methods of controlling – evaluation, control systems and devices. Budgeting as a tool for planning and control. Record keeping as a tool of control. Functional areas of management – operations management – physical facilities, implementing the plan, scheduling the work,

Suggested Reading
10. Shapiro E. Macroeconomic analysis. Galgotia Publications Delhi

18HO2021 POSTHARVEST MANAGEMENT AND PROCESSING OF HORTICULTURAL CROPS

Credits 2:0:2

Course Objectives
- To learn about the importance of postharvest technology of horticultural crops and related concepts
- To be familiar with post-harvest operations of fruits, vegetables, ornamentals, plantation crops, spices, medicinal and aromatic plants
- To be familiar with government schemes and regulations with regard to import and export of horticultural produce
- To learn about the various food processing methods of horticultural crops

Course Outcomes
- Remember the different post harvest management in important horticultural crops
- Explain the value addition process of important horticultural crops
- Develop knowledge about the government schemes and laws in import and Theory

Importance of Postharvest Technology in horticultural crops. Maturity indices, harvesting, handling, grading of fruits, vegetables, cut flowers, plantation crops, spices, medicinal and aromatic plants. Pre-harvest factors affecting quality, factors responsible for deterioration of horticultural produce, physiological and bio-chemical changes, hardening and delaying ripening process. Postharvest treatments of horticultural crops. Quality parameters and specifications. Structure of fruits, vegetables and cut
flowers related to physiological changes after harvest. Pre-harvest treatment and pre-cooling, prestorage treatments. Different systems of storage, packaging methods and types of packages, recent advances in packaging. Principles and methods of preservation by heat - pasteurization, canning, bottling. Methods of preparation of juices, squashes, syrups, cordials and fermented beverages. Jam, jelly and marmalade. Preservation by sugar and chemicals, candies, crystallized fruits, preserves chemical preservatives, preservation with salt and vinegar, pickling, chutneys and sauces, tomato and mushrooms, freezing preservation. Processing of plantation crops, products, spoilage in processed foods, quality control of processed products, Govt. policy on import and export of processed fruits. Food laws.

Practical
Practice in judging the maturity of various horticultural produce, determination of physiological loss in weight and quality. Grading of horticultural produce, post-harvest treatment of horticultural crops, physical and chemical methods. Packaging studies in fruits, vegetables, plantation crops, spices and cut flowers by using different packaging materials, methods of storage, post-harvest disorders in horticultural produce. Equipments used in food processing units. Physico-chemical analysis of fruits and vegetables. Canning of fruits and vegetables, preparation of squash, RTS, cordial, syrup, jam, jelly, marmalade, candies, preserves, chutneys, sauces, pickles (hot and sweet). Dehydration of fruits and vegetables tomato product dehydration, refrigeration and freezing, cut out analysis of processed foods. Processing of plantation crops. Visit to processing units.

References:

18HO2022 BREEDING AND SEED PRODUCTION OF FLOWER AND ORNAMENTAL PLANTS

Credits 2:0:1

Course Objectives
- To study about breeding methods and techniques of important flowers and ornamentals
- To learn about the various seed production and biotechnological techniques for genetic improvement of flowers and ornamentals
- To be familiar with seed certification laws

Course Outcome
At the end of this course, the students will be able to
- Remember the different breeding aspects in important flower and ornamental crops
- Explain the seed production techniques in important flower and ornamental crops
- Gain knowledge about seed certification

Theory
History of improvements of ornamental plants, Centre of origin of flower crops and ornamental crops, objectives and techniques in ornamental plant breeding. Introduction, selection, hybridization, mutation and biotechnological technique for improvement of ornamental and flower crops viz., Rose, Jasmine, Chrysanthemum, Tuberose, Gerbera, Gladiolus, dahlia Heliconia, Lilium, Gaillardia, Petunia, Hibiscus, Bouganvillea, Zinnia, Cosmos, Dianthus, Snapdragon, Pansy, crossandra, marigold, geranium, antirrhinum, china aster, orchids, anthurium, carnation, hibiscus etc. Breeding for disease resistance.
Development of promising cultivars of important ornamentals and flower crops. Role of heterosis and its exploitation, production of F1 hybrids and utilization of male sterility, production of open pollinated seed. Harvesting processing and storage of seeds, seed certification.

**Practical**
Study of floral biology and pollination in important species and cultivars. Techniques of inducing polyploidy and mutation. Production of pure and hybrid seeds. Harvesting, conditioning and testing of seeds. Practice in seed production methods.

**References:**

**18HO2023 NEMATODE PESTS OF HORTICULTURAL CROPS AND THEIR MANAGEMENT**

**Credits 1:0:1**

**Course Objectives**
- To study taxonomy, classification, and characteristics of plant parasitic nematodes
- To learn about the role of nematodes in plant disease complex
- To be familiar with principles of integrated nematode management

**Course Outcome**
At the end of this course, the students will be able to
- Remember taxonomy, classification and characteristics of plant-parasitic nematodes
- Explain role of nematodes in plant disease complex
- Gain knowledge on Integrated nematode management

**Theory**
History and development of nematology - definition, economic importance. General characters of plant parasitic nematodes, their morphology, taxonomy, classification, biology, symptomatology and control of important plant parasitic nematodes of fruits – (tropical, subtropical and temperate) vegetables, tuber, ornamental, spice and plantation crops. Role of nematodes in plant disease complex. Integrated nematode management.

**Practical**
Methods of sampling and extraction of nematodes from soil and plant parts, killing, fixing and preparation of temporary and permanent nematode mounts. Nematicides and their use. Collection and preservation of 20 plant species/part damaged by plant parasitic nematodes.

**References:**
**18HO2024 APICULTURE, SERICULTURE AND LAC CULTURE**

**Credits 1:0:1**

**Course Objectives**
- To learn about different beneficial insects such as honey bee, silkworm and lac insect
- To study in detail about the classification, life cycle and maintenance of honey bee
- To learn about rearing of mulberry silkworm, mulberry cultivation, and economics of silk production and lac growing in India
- To know about the pest and diseases of honey bees, silkworms and lac insects

**Course Outcome**
At the end of this course, the students will be able to
- Remember various kinds of beneficial insects
- Explain rearing techniques/methods used for mass production of beneficial insects
- Gain knowledge about the pest and disease of honey bees, silkworms and lac insects and other constraints in mass production of beneficial insects

**Theory**

**Practical**

**References:**
18HO2025 STUDY TOUR – II

Credits 0:0:1

Course Objectives
- To be familiar with the various horticultural research stations in the state of Tamilnadu/India
- To learn about the ongoing agricultural research and extension programmes organized by various horticultural research stations in the state/Country

Course Outcome
At the end of this course, the students will be able to
- Gain practical knowledge about horticultural crops and cropping systems in the different agro-climatic zones and horticultural crops in Tamil Nadu
- Learn social, cultural aspects of different agricultural zones in Tamil Nadu
- Identify and analyze different soil types and cropping systems for horticultural crops in Tamil Nadu

Course Content:
The study tour programme is of one week, during this period various Agricultural Research Stations, Institutions or Colleges will be visited. This is to get an exposure of various ongoing research and extension activities in different agro-eco systems in the State/Country.

Evaluation and mark distribution
In the study tour programme, full attendance is mandatory for a pass as per the ICAR regulations.
The marks awarded as follows for the evaluation of the courses
- Attendance and general behaviour - 35
- Report of the study tour - 35
- Exam (internal) - 20
- Viva - 10
- Total - 100
HORTICULTURE
## LIST OF COURSES

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<td>Insect Pests of Fruit, Plantation, Medicinal &amp; Aromatic Crops</td>
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### 18HO1001 FUNDAMENTALS OF HORTICULTURE

**Credits 2:0:1**

**Course Objectives**
- To study the basics of horticulture and horticultural practices
- To expose the students to different horticulture divisions
- To impart knowledge on different types of plant propagation and propagating structures

**Course Outcome**
- Basics of horticulture and classification of crops learned
- Different types of plant propagation techniques and propagating structures studied
- Gain practical knowledge in Special horticultural practices

**Theory**

Practical
Features of orchard, planning and layout of orchard, tools and implements, identification of various horticultural crops, layout of nutrition garden, preparation of nursery beds for sowing of vegetable seeds, digging of pits for fruit plants, planting systems, training and pruning of orchard trees, preparation of fertilizer mixtures and field application, preparation and application of growth regulators, layout of different irrigation systems, identification and management of nutritional disorder in fruits, assessment of bearing habits, maturity standards, harvesting, grading, packaging and storage, Visit to Private and Govt. nursery and orchard.

Text books

18HO1002 GROWTH AND DEVELOPMENT OF HORTICULTURAL CROPS

Credits 2:0:1

Course objectives
- To impart knowledge on basis of growth and development of horticultural crops
- To study the effects of factors responsible for physiological processes
- To learn physiological basis of horticultural practices

Course outcomes
- Gained knowledge on basis of growth and development of horticultural crops
- Students learnt the effects of factors responsible for physiological processes in horticultural crops
- Gained knowledge on physiological basis of horticultural practices

Theory
Growth and development-definitions, components, photosynthetic productivity, Canopy photosynthesis and productivity, leaf area index (LAI) - optimum LAI in horticultural crops, canopy development; different stages of growth, growth curves, Crop development and dynamics (Case studies of annual/perennial horticultural crops), growth analysis in horticultural crops. Plant bio-regulators- auxin, gibberellin, cytokinin, ethylene inhibitors and retardants, basic functions, biosynthesis, role in crop growth and development, propagation, flowering, fruit setting, fruit thinning, fruit development, fruit drop, and fruit ripening. Flowering-factors affecting flowering, physiology of flowering, photoperiodism-long day, short day and day neutral plants, vernalisation and its application in horticulture, pruning and training physiological basis of training and pruning-source and sink relationship, translocation of assimilates. Physiology of seed development and maturation, seed dormancy and bud dormancy, causes and breaking methods in horticultural crops. Physiology of fruit growth and development, fruit setting, factors affecting fruit set and development, physiology of ripening of fruits-climatic and non-climacteric fruits. Physiology of fruits under post-harvest storage.

Practical
Estimation of photosynthetic potential of horticultural crops, leaf area index, growth analysis parameters including harvest index, bioassay of plant hormones, identification of synthetic plant hormones and growth retardants, preparations of hormonal solution and induction of rooting in cuttings, ripening of fruits and control of flower and fruit drop. Important physiological disorders and their remedial measures in fruits and vegetables, seed dormancy, seed germination and breaking seed dormancy with chemicals and growth regulators.

Text books
18HO1003 PROPAGATION AND NURSERY MANAGEMENT FOR HORTICULTURAL CROPS

Credits 2:0:1

Course Objectives
- To impart skill oriented knowledge on media preparation and handling of tools for propagation
- To teach students on propagation methods
- To familiarize with the maintenance and after care of propagated plants

Course Outcome
- Students benefited with hands-on training in media preparation handling of tools for propagation
- Students learnt about mother plant selection and propagation techniques
- Students familiarized with the maintenance and after care of propagated plants

Theory

Practical

Text books

18HO1004 PRODUCTION TECHNOLOGY OF TROPICAL AND SUBTROPICAL FRUITS

Credits 2:0:1

Course Objective:
- To impart knowledge on basic cultural practices of Tropical and Subtropical Fruits crops
- To insist on modern techniques to increase the yield and production
- To learn about the special practices, harvesting and post-harvest handling of Tropical and Subtropical Fruits
Course Outcome:
- The student gains a thorough knowledge on basic production technology
- Familiarize on modern production techniques
- Acquaintance on special practices, harvesting and post-harvest handling

Theory
Horticultural classification of fruits including genome classification. Horticultural zones of India, detailed study of area, production and export potential, varieties, climate and soil requirements, propagation techniques, planting density and systems, after care, training and pruning. Management of water, nutrient and weeds, special horticultural techniques including plant growth regulators, their solution preparation and use in commercial orchards. Physiological disorders. Post-harvest technology, harvest indices, harvesting methods, grading, packaging and storage of the following crops. Mango, banana, grapes, citrus, papaya, sapota, guava, pomegranate, bael, ber, amla, anona, fig, pineapple, jackfruit, avocado, mangosteen, litchi, carambola, durian, rambutan, bilimbi, loquat, rose apple breadfruit and passion fruit. Bearing in mango and citrus, causes and control measures of special production problems, alternate and irregular bearing overcome, control measures. Seediness and kokkan disease in banana, citrus decline and casual factors and their management. Bud forecasting in grapes, sex expression and seed production in papaya, latex extraction and crude papain production, economic of production.

Practical
Description and identification of varieties based on flower and fruit morphology in above crops. Training and pruning of grapes, mango, guava and citrus. Selection of site and planting system, pre-treatment of banana suckers, desuckering in banana, sex forms in papaya. Use of plastics in fruit production. Visit to commercial orchards and diagnosis of maladies. Manure and fertilizer application including bio-fertilizer in fruit crops, preparation and application of growth regulators in banana, grapes and mango. Seed production in papaya, latex extraction and preparation of crude papain. Ripening of fruits, grading and packaging, production economics for tropical and sub-tropical fruits. Mapping of arid and semi-arid zones of India. Botanical description and identification of ber, fig, jamun, pomegranate, carissa, phalsa, wood apple, West Indian cherry, tamarind, aonla, bael and anonna.

Text books

18HO1005 PRODUCTION TECHNOLOGY OF TROPICAL AND SUBTROPICAL VEGETABLES

Credits 2:0:1
Course Objective:
- To impart knowledge on basic cultural practices of vegetables crops.
- To insist on modern techniques to increase the yield and production.
• To learn about the economic estimation of commercial vegetable crops.

Course Outcome:
• The student gains a thorough knowledge on basic production technology.
• Familiarize on basic gardening techniques.
• Acquaintance on commercial oriented cultural practices.

Theory
Area, production, economic importance and export potential of tropical and sub-tropical vegetable crops. Description of varieties and hybrid, climate and soil requirements, seed rate, preparation of field, nursery practices; transplanting of vegetable crops and planting for directly sown/transplanted vegetable crops. Spacing, planting systems, water and weed management; nutrient management and deficiencies, use of chemicals and growth regulators. Cropping systems, harvest, yield, post-harvest handling, economics and marketing of tropical and subtropical vegetable crops such as tomato, brinjal, chillies, capsicum, okra, amaranthus, cluster beans, cowpea, lab-lab, snap bean, cucurbits, moringa, curry leaf, portulaca, basella, sorrel and roselle.

Practical
Identification and description of tropical and sub-tropical vegetable crops; nursery practices and transplanting, preparation of field and sowing/planting for direct sown and planted vegetable crops. Herbicide use in vegetable culture; top dressing of fertilizers and intercultural; use of growth regulators; identification of nutrient deficiencies. Physiological disorder. Harvest indices and maturity standards, post-harvest handling and storage, marketing, seed extraction (cost of cultivation for tropical and subtropical vegetable crops), project preparation for commercial cultivation.

Text book

18HO1006 Irrigation and Weed Management in Horticultural Crops

Credits 2:0:1
Course objectives
• To study soil, water and plant relationships and soil moisture constant with special reference to horticultural plants
• To introduce the concepts of water requirement of horticultural crops and its irrigation management
• To study the importance of weeds its classification and management with reference to horticultural plants

Course objectives
• Students gained practical knowledge on surface irrigation, pressurized irrigation, micro irrigation and fertigation
• Students learnt the layout of micro irrigation (Drip irrigation) to the horticultural crops
• Students gained knowledge on the principles of integrated weed management with special reference to horticultural plants

Theory

Weeds: Introduction, harmful and beneficial effects, classification, propagation and dissemination; Weed biology and ecology, crop weed association, crop weed competition and allelopathy Concepts of weed prevention, control and eradication; Methods of weed control: physical, cultural, chemical and biological methods. Integrated weed management; Herbicides: advantages and limitation of herbicide usage in India, Herbicide classification, formulations, methods of application; Introduction to Adjuvants and their use in herbicides; Introduction to selectivity of herbicides; Compatibility of herbicides with other agro chemicals; Weed management in major field and horticultural crops, shift of weed flora in cropping systems, aquatic and problematic weeds and their control.

Practical
Measurements of irrigation water by using water measuring devices, use of common formula in irrigation practices, practicing of land leveling and land shaping implements, layout for different methods of irrigation. Estimation of soil moisture constants and soil moisture by using different, methods and instruments, scheduling of irrigation, different approaches, practicing use of instruments, estimation of irrigation efficiency and water requirements of horticultural crops, irrigation planning and scheduling, soil moisture conservation practices. Identification of weeds; Survey of weeds in crop fields and other habitats; Preparation of herbarium of weeds; Calculations on weed control efficiency and weed index; Herbicide label information; Computation of herbicide doses; Study of herbicide application equipment and calibration; Demonstration of methods of herbicide application; Preparation of list of commonly available herbicides; Study of phytotoxicity symptoms of herbicides in different crops; Biology of nut sedge, bermuda grass, parthenium and celosia; Economics of weed control practices; Tours and visits of problem areas.

Text books

18HO2001 COMMERCIAL FLORICULTURE

Credits 2:0:1

Course objectives
• To educate students on commercial flower crops and their market thrust.
• To know about production technology of looseand cut flowers.
• To know about harvesting and post-harvest handling of loose and cut flowers.
• To know about concrete and other floral extraction methods.
Course outcomes

- Understand the production technology of commercial flowers
- Understanding the harvesting and post-harvest handling of loose and cut flowers
- Equipped for entrepreneurship in commercial floriculture

Theory

Scope and importance of commercial floriculture in India, production techniques of commercial flower crops like rose, marigold, chrysanthemum, orchid, carnation, gladiolus, jasmine, crossandra, anthurium, dahlia, tuberose, bird of paradise, china aster and gerbera for domestic and export market, production techniques of flowers and foliage filler materials growing of flowers under protected environments such as glass house, plastic house etc., postharvest technology of cut flowers in respect of commercial flower crops, dehydration technique for drying of flowers, production techniques for bulbous.

Practical


Reference books


18HO2002 PRODUCTION TECHNOLOGY OF SPICES AND PLANTATION CROPS

Credits 2:0:1

Course Objectives

- To teach scope and importance of spices and plantation crops
- To impart knowledge on production technology of spices and plantation crops
- To impart knowledge on special horticultural practices, various processes and their uses

Course Outcome

- Scope and importance of spices and plantation crops learned
- Production technology of spices and plantation plants studied
- Gain practical knowledge on various processes and their commercial uses

Theory

vine ginger, turmeric, clove, nutmeg, cinnamon, all spice, curry leaf, coriander, fenugreek, fennel, cumin, dill, celery, bishops weed, saffron, vanilla, thyme and rosemary.

Plantation crops: History and development, scope and importance, area and production, export and import potential, role in national and state economy, uses, industrial importance, by products utilization, soil and climate, varieties, propagation: principles and practices of seed, vegetative and micro-propagation, planting systems and method, gap filling, systems of cultivation, mulching, shade regulation, weed and water management, training, pruning and handling, nutrition, foliar feeding, role of growth regulators, soil management, liming practices, top working, physiological disorders, harvesting, post-harvest handling and processing, packaging and marketing, yield and economics of coconut, arecanut, oil palm, palmynrah palm, cacao, cashew nut, coffee, tea, Date palm and rubber.

Practical
Spices: Identification of varieties: propagation, seed treatment – sowing; layout, planting; hoeing and earthing up; manuring and use of weedicides, training and pruning; fixing maturity standards, harvesting, curing, processing, grading and extraction of essential oils and oleoresins.

Plantation crops: Description and identification of coconut varieties, selection of coconut and arecanut mother palm and seed nut, planting of seed nuts in nursery, layout and planting of coconut, arecanut, oil palm, cashew nut, cacao gardens, manuring, irrigation; mulching, raising masonry nursery for palm, nursery management in cacao. Description and identification of species and varieties in coffee, harvesting, grading, pulping, fermenting, washing, drying and packing of coffee, seed berry collection, seed extraction, treatment and sowing of coffee, epicotyl, softwood, grafting and top working in cashew, working out the economics and project preparation for coconut, arecanut, oil palm, cashew nut, cacao, etc. Mother plant selection, preparation of cuttings and rooting of tea under specialized structure, training, centering, pruning, tipping and harvesting of tea. Visit to commercial plantations.

Text books

18HO2003 PRECISION FARMING AND PROTECTED CULTIVATION

Credits 2:0:1
Course objectives
- To impart knowledge on the protected cultivation of vegetables, fruits and flower crops
- To sensitize the students on hi-tech production technology of fruits, vegetables and flower crops
- To learn about precision production technology for important horticultural crops

Course outcomes
- Gain knowledge on the protected cultivation of vegetables, fruits and flower crops
- Gain practical knowledge on hi-tech production technology of fruits, vegetables and flower crops
- Learn about precision production technology for important horticultural crops

Theory
Precision farming – laser leveling, mechanized direct seed sowing; seedling and sapling transplanting, mapping of soils and plant attributes, site specific input application, weed management, insect pests and disease management, yield mapping in horticultural crops. Green house technology, Introduction, Types of Green Houses; Plant response to Greenhouse environment, Planning and design of greenhouses, Design criteria of greenhouse for cooling and heating purposes. Green house equipment, materials of

**Practical**
Study of different types of greenhouses based on shape, construction and cladding materials; Calculation of air rate exchange in an active summer winter cooling system; Calculation of rate of air exchange in an active winter cooling system; Estimation of drying rate of agricultural products inside green house; Testing of soil and water to study its suitability for growing crops in greenhouses; The study of fertigation requirements for greenhouses crops and estimation of E.C. in the fertigation solution; The study of various growing media used in raising of greenhouse crops and their preparation and pasteurization / sterilization; Visit to commercial greenhouses; Economics of protected cultivation.

**Reference books**

18HO2004 DISEASES OF FRUIT, PLANTATION, MEDICINAL AND AROMATIC CROPS

**Credits** 2:0:1

**Course objectives**
- To study about Etiology, symptoms, mode of spread and survival of diseases
- To study the symptoms of major diseases and host parasite relationship
- To impart knowledge on integrated management of important diseases of fruit, Plantation, Medicinal and Aromatic Crops

**Course outcomes**
- Learnt about Etiology, symptoms, mode of spread and survival of diseases
- Gain knowledge of symptoms of major diseases and host parasite relationship
- Learnt about integrated management of important diseases of fruit, Plantation, Medicinal and Aromatic Crops

**Theory**
Etiology, symptoms, mode of spread, epidemiology and integrated management of the diseases of fruits, plantation, medicinal and aromatic crops viz mango, banana, grape, citrus, guava, sapota, papaya, jack fruit, pineapple, pomegranate, ber, apple, pear, peach, plum, almond, walnut, strawberry, areca nut, coconut, oil palm, coffee, tea, cocoa, cashew, rubber, betel vine senna, neem, hemp, belladonna, pyrethrum, camphor, costus, crotalaria, datura, dioscorea, mint, opium, Solanumkhasianum and Tephrosia. Important post-harvest diseases of fruit, plantation and medicinal and aromatic crops and their management.

**Practical**
Observations of disease symptoms, identification of casual organisms and host parasite relationship of important diseases. Examination of scrapings and cultures of important pathogens of fruits, plantation, medicinal and aromatic crops.

**Reference books**
18HO2005 SOIL FERTILITY AND NUTRIENT MANAGEMENT

Credits 1:0:1
Course Objectives:
1. To study the role of nutrients in horticultural crop production
2. To learn the soil fertility evaluation and soil testing methods
3. To familiarize the concept and management of INM

Course Outcome:
1. Studied the role of nutrients in horticultural crop production
2. Learnt the soil fertility evaluation and soil testing methods
3. Familiarized the concept and management of INM

Theory

Practical

Text books

18HO2006 PRODUCTION TECHNOLOGY OF TEMPERATE VEGETABLE CROPS

Credits 1:0:1
Course Objectives
• To familiarize the students about the scenario of temperate vegetable crops cultivation
• To know about advanced production technologies of temperate vegetable crops
• To learn about post-harvest handling of temperate vegetable crops

Course outcomes
• Scope and importance of temperate vegetable crops learned
• Advance production technology of temperate vegetable crops studied
Gain practical knowledge on post-harvest handling of temperate vegetable crops

Theory
Importance of cool season vegetable crops in nutrition and national economy. Area, production, export potential, description of varieties and hybrids, origin, climate and soil, production technologies, post-harvest technology and Marketing of cabbage, cauliflower, knolokhol, sprouting broccoli, Brussels’ sprout, lettuce, palak, Chinese cabbage, spinach, garlic, onion, leek, radish, carrot, turnip, beet root, peas, broad beans, rhubarb, asparagus, globe artichoke, Vegetable kale.

Practical
Identification and description of varieties/hybrids; propagation methods, nursery management; preparation of field, sowing/transplanting; identification of physiological and nutritional disorders and their corrections; post-harvest handling; cost of cultivation and field visits to commercial farms.

Text books

18HO2007 PRODUCTION TECHNOLOGY OF TEMPERATE FRUIT CROPS
Credits:1:0:1
Course Objectives
• To know the scenario and scope of temperate fruit crops
• To impart knowledge about the cultivation aspects of temperate fruit crops
• To study the different horticultural practices in cultivation of temperate fruit crops

Course Outcome
• Scope and Importance of temperate fruit crops learnt
• Practical knowledge on the cultivation aspects of temperate fruit crops
• Studied different horticultural practices in cultivation of temperate fruit crops

Theory
Classification of temperate fruits, detailed study of areas, production, varieties, climate and soil requirements, propagation, planting density, cropping systems, after care training and pruning, self-incompatibility and pollinisers, use of growth regulators, nutrient and weed management, harvesting, post-harvest handling and storage of apple, pear, peach, apricot, plum, cherry, persimmon, strawberry, kiwi, Queens land nut (Mecademia nut), almond, walnut, pecan nut, hazel nut and chest nut. Re-plant problem, rejuvenation and special production problems like pre-mature leaf fall, physiological disorders, important insect – pests and diseases and their control measures. Special production problems like alternate bearing problem and their remedies.

Practical
Nursery management practices, description and identification of varieties of above crops, manuring and fertilization, planting systems, preparation and use of growth regulators, training and pruning in apple, pear, plum, peach and nut crops. Visit to private orchards to diagnose maladies. Working out economics for apple, pear, plum and peach.

Text books
18HO2008 PRODUCTION TECHNOLOGY OF MEDICINAL AND AROMATIC CROPS

Credits 2:0:1

Course Objectives
- To learn scope and importance of medicinal and aromatic crops
- To study about production technology of medicinal and aromatic plants
- To impart knowledge on various processes, essential oil and their commercial uses

Course Outcome
- Scope and importance of medicinal and aromatic crops learned
- Production technology of medicinal and aromatic plants studied
- Gain practical knowledge various processes, essential oil and their uses of medicinal and aromatic plants

Theory
History, scope, opportunities and constraints in the cultivation and maintenance of medicinal and aromatic plants in India. Importance, origin, distribution, area, production, climatic and soil requirements, propagation and nursery techniques, planting and after care, cultural practices, training and pruning, nutritional and water requirements. Plant protection, harvesting and processing of under mentioned important medicinal and aromatic plants. Study of chemical composition of a few important medicinal and aromatic plants, extraction, use and economics of drugs and essential oils in medicinal and aromatic plants. Therapeutic and pharmaceutical uses of important species. Storage techniques of essential oils.

Medicinal Plants: Withania, periwinkle, Rauvolfia, Dioscorea, Isabgol, opium poppy Ammimajus, Belladonna, Cinchona, Pyrethrum and other species relevant to local conditions. Aromatic Plants: Citronella grass, khus grass, flag (baje), lavender, geranium, patchouli, bursera, menthe, musk, occimum and other species relevant to the local conditions. Marketing.

Practical
Collection of medicinal and aromatic plants from their natural habitat and study their morphological description, nursery techniques, harvesting, curing and processing techniques and extraction of essential oils.

Text books

18HO2009 BREEDING OF VEGETABLES, MEDICINAL AND AROMATIC CROPS

Credits 3:0:1

Course objective
- To study the basics of floral biology of Vegetables, Medicinal and Aromatic crops
- To gain knowledge on pollination mechanism, breeding strategies in Vegetables, Medicinal and Aromatic crops
- To learn about methods of breeding and achievements in crop improvement of Vegetables, Medicinal and Aromatic crops

Course outcome
- To learnt basics of floral biology of Vegetables, Medicinal and Aromatic crops
- Practical knowledge gained on pollination mechanism, breeding strategies in Vegetables, Medicinal and Aromatic crops
- Learnt about methods of breeding and achievements in crop improvement of Vegetables, Medicinal and Aromatic crops
Theory

Practical
Floral biology and pollination mechanism in self and cross pollinated vegetables, tuber crops and spices. Working out phenotypic and genotypic heritability, genetic advance. GCA, SCA, combining ability, heterosis, heterobeltosis, standard heterosis, GxE interactions (stability analysis) Preparation and uses of chemical and physical mutagens. Polyploidy breeding and chromosomal studies. Techniques of F1 hybrid seed production. Maintenance of breeding records.

Text Books

18HO2010 DISEASES OF VEGETABLES, FLOWERS, ORNAMENTAL AND SPICE CROPS

Credits 2:0:1

Course Objectives:
- To impart knowledge on diseases of vegetables, flowers, ornamental and spice crops
- To make the student understand the symptoms and their spread
- To learn basics of plant disease management

Course Outcome:
- Able to know and understand diseases of vegetables, flowers, ornamental and spice crops and losses
- Knowledge on symptoms and their mode of spread will be imparted
- Plant disease management will be studied

Theory
Etiology, symptoms, mode of spread, epidemiology and integrated management of diseases of the following vegetables, ornamental and spice crops: tomato, brinjal, chilli, bhindi, cabbage, cauliflower, radish, knol-khol, pea, beans, beet root, onion, garlic, fenugreek, ginger, potato, turmeric, pepper, cumin, cardamom, nutmeg, coriander, clove, cinnamon, jasmine, rose, crossandra, tuberose, gerebera, anthurium, geranium. Important post-harvest diseases of vegetables and ornamental crops and their management.

Practical
Observations of symptoms, causal organisms and host parasitic relationship of important diseases, examination of cultures of important pathogens of vegetables, ornamental and spice crops in field as well as in protected cultivation.
Reference books
1. Srikant Kulkarni, Yashoda R. Hedge. Diseases of Plantation crops and their management-, Agrotech publication Academy

18HO2011 INSECT PESTS OF FRUIT, PLANTATION, MEDICINAL & AROMATIC CROPS
Credits 2:0:1
Course objective
- To learn about Insect Ecology and factors responsible for outbreaks
- To study on methods of pest control in Fruit, Plantation, Medicinal & Aromatic crops
- To learn about integrated pest management of Fruit, Plantation, Medicinal & Aromatic crops

Course outcome
- Learnt about Insect Ecology and factors responsible for outbreaks
- Practical knowledge on methods of pest control in Fruit, Plantation, Medicinal & Aromatic crops
- Gain knowledge on integrated pest management of Fruit, Plantation, Medicinal & Aromatic crops

Theory
General – economic classification of insects; Bio-ecology and insect-pest management with reference to fruit, plantation, medicinal and aromatic crops; pest surveillance. Distribution, host range, bio-ecology, injury, integrated management of important insect pests affecting tropical, sub-tropical and temperate fruits, plantation, medicinal and aromatic crops like coconut, areca nut, oil palm, cashew, cacao, tea, coffee, cinchona, rubber, betel vine senna, neem, belladonna, pyrethrum, costus, crotalaria, datura, Dioscorea, mint, opium, Solanumkhasianum and. Storage insects – distribution, host range, bio-ecology, injury, integrated management of important insect pests attacking stored fruits, plantation, medicinal and aromatic crops and their processed products. Insecticide residue problems in fruit, plantation, medicinal and aromatic crops and their maximum residue limits (MRLs).

Practical
Study of symptoms of damage, collection, identification, preservation, assessment of damage and population of important insect – pests affecting fruits, plantation, medicinal and aromatic crops in field and storage.

Text Books
HORTICULTURE
### LIST OF COURSES

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#### 17HO1001  BOTANY OF HORTICULTURAL CROPS

**Credits:** 3:0:0  

**Course Objectives:**
- To teach the fundamentals of botany of the horticultural crops
- To expose the student to systematic botany
- To learn the basics of morphology and taxonomy of crops

**Course Outcome:**
- The students learned the basics of botany
- The students familiarized with botanical terms in relation to horticultural crops
- This fundamental course helped students to understand the breeding of horticultural crops

**Description:**
Systematic botany – terminology, morphological description and classification – root, stem, leaf, inflorescence, flower and fruit – flowering mechanism – modes of pollination asexual/vegetative reproduction – floral biology – fertilization and fruit set. Principles involved in nomenclature, ICBN rules and recommendations with special reference to names of hybrids and names of cultivated plants. Floral biology, pollination, fruit set and economic part in the families; Anacardiaceae (mango, cashew), Rutaceae (acid lime, sweet orange and mandarin), Musaceae, Moraceae, Vitaceae, Caricaceae, Euphorbiaceae (aonla, cassava, rubber), Myrtaceae (guava, clove), Sapotaceae, Bromeliaceae, Punicaceae, Annonaceae (custard apple), Rhamnaceae and Rosaceae (apple, pear, plum, rose). Floral biology, pollination, fruit set and economic part in the families; Solanaceae (tomato, brinjal, chilli, potato), Malvaceae, Cucurbitaceae (pumpkin, watermelon, muskmelon, ridge gourd, bitter gourd, cucumber), Moringaceae, Fabaceae (peas, French beans), Alliaceae (onion, garlic), Brassicaceae (cabbage, cauliflower, radish), Chenopodiaceae, Amaranthaceae, Convolvulaceae (sweetpotato), Araceae (elephant foot yam, colocasia), Dioscoreaceae (yam, medicinal Dioscorea). Floral biology, pollination, fruit set and economic part in the families; Piperaceae (pepper, betel vine) Zingiberaceae (cardamon, turmeric, ginger), Orchidaceae (Vanilla, Dendrobium orchid), Apiaceae (Umbelliferae) (coriander), Myristicaceae, Lauraceae, Leguminosae, Caesalpiniaeae, Camelliaceae, Rubiaceae, Arecaceae(Palmae) (coconut, arecanut, palmyrah, oil palm), Sterculiaceae(Cocoa). Floral biology, pollination, fruit set and economic part in the families; Oleaceae (maligni, mullah, jathimalli), Asteraceae (chrysanthemum, marigold, marikulundu, gerbera, golden rod, aster, pyrethrum), Amaryllidaceae, Acanthaceae, Caryophyllaceae, Iridaceae, Apocynaceae, Poaceae (Graminaceae), (lemongrass, citronelle, palmarosa, vetiver), Geraniaceae, Lamiaeaceae (Labiatae) (coleus, patchouli, mint, maruvi), Scrophulariaceae.

**Practical:**
Observations and recordings of the morphology of root, stem, leaf, flower and fruit. Study of taxonomy and morphology of crops in the above families – herbarium (minimum 50 – covering not less than 25 families) - collection of the crops mentioned in theory.

**References:**
17HO1002 PROPAGATION OF HORTICULTURAL CROPS

Credits: 2:0:1

Course Objectives:
- To impart skill oriented knowledge on media preparation
- To teach students on propagation methods
- To familiarize with the maintenance and after care of propagated plants

Course Outcome:
- Students benefited with hands-on training in media preparation
- Students learned about mother plant selection and propagation techniques
- Students familiarized with the maintenance and after care of propagated plants

Description:

Practical:
Propagation structures - tools and implements - propagation media - containers - preparation of nursery beds - seed treatment - sowing - plug transplants / seedling production - potting, depotting and repotting of plants - methods of asexual propagation through cuttings, layering, grafting and budding - scion bank - techniques of cuttings - leaf and leaf bud cuttings - stem cuttings - single nodal cuttings and root cuttings - techniques of layering - leaf and leaf bud cuttings - stem cuttings - single nodal cuttings and root cuttings - techniques of layering - potting of layers and hardening - grafting methods - separation of grafts - potting and maintenance of grafted plants - budding and maintenance of budded plants - mist chamber - structures - maintenance - use of mist chamber for seed and vegetative propagation - hardening and maintenance - shade structure - nutrition and plant protection - application of growth regulators - standardization of formulations - growth regulators for seed and vegetative propagation - project preparation for commercial nurseries — visit to commercial nurseries and tissue culture units.

References:

**17HO1003 PRODUCTION TECHNOLOGY OF TROPICAL AND ARID ZONE FRUIT CROPS**

**Credits: 2:0:1**

**Course Objectives:**
- To impart knowledge on the scenario of fruit cultivation in tropical and arid zones
- To impart knowledge on advanced production techniques
- To apprise on production constraints

**Course Outcome:**
- Practical knowledge on specialized production techniques of tropical and arid zone fruits
- Understanding the production constraints
- Skill management for solving field problems

**Description:**

Practical:
Description and identification of cultivars/varieties - nursery management - nursery preparation, seed sowing and raising seedlings / rootstocks, practicing propagation techniques of mango, banana, papaya, sapota, guava, acid lime, sweet orange, aonla, ber, pomegranate, date palm, custard apple, jamun, bael, wood apple and manila tamarind. Banana scoring techniques. Selection and pre-treatment of banana suckers - desuckering in banana –planting systems- manures, fertilizers and biofertilizers application in mango, banana, papaya, sapota, guava, acid lime, sweet orange and aonla – application of growth regulators - sex forms in papaya – sibmating and seed production in papaya – latex extraction and preparation of crude papain – training and pruning in mango, sapota, guava, acid lime and sweet orange, aonla, ber, pomegranate and date palm - practising harvesting methods - ripening of fruits - grading and packaging - visit to commercial orchards - project preparation on production economics for fruits.

References:

17HO1004 PRODUCTION TECHNOLOGY OF TROPICAL VEGETABLE CROPS
Credits: 2:0:1
Course Objectives:
• To teach the students on the scenario of vegetable cultivation
• To impart knowledge on advanced production techniques
• To appraise on production constraints
Course Outcome:
• Hands-on experience of vegetable cultivation
• Knowledge on quality requirement and production techniques
• Skill management for solving field problems
Description:
Overview of vegetable cultivation: Area, production, world scenario, industrial importance, export potential of tropical vegetable crops – institutions involved in vegetable crops research. Classification of vegetable crops - Effect of climate, soil, water and nutrients on vegetable crop production and their management– cropping systems. Vegetable production in nutrition garden, kitchen garden, truck garden, market garden, roof garden, floating garden – types of vegetable farming and contract farming- rice fallow cultivation, river bed cultivation, rain fed cultivation, organic farming – GAP in vegetable production – export standards of vegetables. Solanaceous vegetables and bhendi: Composition and uses – area and production- climate and soil requirements – season-varieties and hybrids – seed rate- nursery practices-containerized transplant production and transplanting –preparation of field-spacing-planting systems-planting- water and weed management-nutrient requirement-fertilization-nutrient deficiencies-physiological disorders- use of chemicals and growth regulators-cropping systems-constraints in production-harvest-
yield crops. Tomato, brinjal, chilli and bhendi. Bulbous and Cucurbitaceous vegetable crops: Composition and uses-
area and production- climate and soil requirements – season - varieties and hybrids -seed rate – nursery practices –
containerized transplant production and transplanting- preparation of field - spacing - planting systems - planting-
water and weed management – nutrient requirement – fertigation - nutrient deficiencies – physiological disorders –
sex expression - use of chemicals and growth regulators - cropping systems – constraints in production - harvest –
yield. Onion, ash gourd, pumpkin, bitter gourd, snake gourd, ribbed gourd, bottle gourd, watermelon, musk melon,
ococcinia, cucumber and gherkin. Fabaceous vegetable crops and greens: Composition and uses- origin and
distribution- area and production- climate and soil requirements – season - varieties and hybrids - seed rate –
preparation of field - spacing - planting systems - planting – water and weed management – nutrient requirement –
fertigation - nutrient deficiencies – physiological disorders- use of chemicals and growth regulators - cropping
systems – constraints in production harvest – yield. Cluster beans, cowpea, lab-lab, moringa, chekurmanis, palak,
basella and amaranth. Tuber crops: Composition and uses- origin and distribution- area and production- climate and
soil requirements – season - varieties and hybrids - seed rate –preparation of field - nursery practices and
transplanting – spacing - planting systems - planting – water and weed management – nutrient requirement –
fertigation - nutrient deficiencies – physiological disorders- use of chemicals and growth regulators - cropping
systems – - constraints in production –virus elimination in cassava- harvest – yield. Cassava, sweet potato,
colocasia, vegetable coleus, amorphophallus, edible dioscorea, and yam bean.

Practical:
Identification and description of tropical vegetable crops –nursery practices and transplanting for transplanted
vegetable crops- preparation of field and sowing/planting for direct sown/ transplanted vegetable crops, kitchen
garden- herbicide use in vegetable culture - top dressing of fertilizers and inter-culture – use of growth regulators –
identification of nutrient deficiencies - physiological disorders- harvest indices and maturity standards - post harvest
handling and storage – marketing – seed extraction- working out cost of cultivation for tropical vegetable crops –
project preparation for commercial cultivation. Visit to commercial vegetable growing areas, market and processing
centre.

References:
Production, New India Publishing Agency, New Delhi.
New Delhi.
Production, International Book Distributing Co., Lucknow.
III, Kolkata.
A. E. Publication, Coimatore.