

***FACULTY OF AGRICULTURE
&
ANIMAL HUSBANDRY***

Post Diploma in Commerical Horticulture

**Syllabus
2015**

GANDHIGRAM RURAL INSTITUTE
[DEEMED UNIVERSITY]
GANDHIGRAM

POST DIPLOMA IN COMMERCIAL HORTICULTURE

Introduction

Gandhigram is situated in the midst of the horticulture belt of Dindigul district. The climatic conditions are favourable for raising fruits, vegetables and flowers in the temperate, sub-tropical and tropical regions of this horticultural belt. There is an immense potential for the horticultural farming and horticulture based industries like fruit and vegetable preservation, papain extraction, concrete extraction from flowers, essential oil extraction from aromatic plants like lemon grass, palmarosa etc.

The Faculty of Agriculture and Animal Husbandry with its well established orchard cum nursery possess other fruit orchards, Plantations, flower growing farms. Horticultural research stations are very close to the University. Considering the importance of horticultural farming, it is proposed to start a Post Diploma in Commercial Horticulture in Gandhigram Rural Institute to the two year Diploma / Certificate holders in Agriculture.

About the course

This course is of One Year duration and the medium of instruction is English. The various subjects with reference to commercial horticulture will be taught. In this course, more emphasis is given for practical training, each Tour and Field Placement will be considered as part of the curriculum especially for plantation crops.

Details of the course

Name of the course : Post Diploma in Commercial Horticulture (PDCH)

Duration of the course : One year (Two semesters)

Number of students : 15

Be admitted per year

Basic qualification : Two-year Diploma / Certificate holders in Agriculture.

The course is open to both boys and girls.

Aims and objectives of the course

1. To impart skill in propagation of plants and management of nursery
2. To develop skill in laying out and maintenance of orchard
3. To train in laying out, establishing and maintenance of ornamental gardens, parks, Commercial Flower Garden etc.
4. To impart practical training in the maintenance of spices, condiments, plantation crops, medicinal and aromatic plants etc.
5. To impart skill in preservation of fruits and vegetables
6. Horticultural farming is an important component for rural development; hence it provides a opportunity to start their own horticultural farming with financial assistance from Banks.
7. It provides an opportunity to work in State Horticulture Department, Agriculture Department, Private firms, Companies, Estates, Plantations and also in the organizations involved in interior decoration.

Syllabus pattern

The syllabus pattern is furnished in Annexure. The syllabus for individual subjects has been prepared to cover one academic year. Choice Based Credit System (CBCS) is followed.

Assessment:

In this programme, each theory cum practical course will have a maximum score of 150, with 100 for theory and 50 for practical. Practical courses/ components of one/ two credit(s) will have a maximum score of 50 and the ratio between CFA and ESE is 50:50.

**FACULTY OF AGRICULTURE AND ANIMAL HUSBANDRY
GANDHIGRAM RURAL INSTITUTE – DEEMED UNIVERSITY - GANDHIGRAM**

**POST DIPLOMA IN COMMERCIAL HORTICULTURE
Scheme of Examinations 2015**

Code No.	Subject	Credit			Total Marks
		T	P	Total	
I Semester					
15HORU0101	Principles of Horticulture	3	1	4	150
15HORU0102	Nursery Management for Horticultural Crops	3	1	4	150
15HORU0103	Fruit Production	3	1	4	150
15HORU0104	Vegetable Production	3	1	4	150
15HORU0105	Commercial Flower Cultivation	3	1	4	150
15AEXU0110	Communication for Management	3	0	3	100
		18	5	23	850
15VPPU0101	Village Placement Programme*	-	2	2	100
II Semester					
15HORU0106	Spices, Condiments and Plantation Crops	3	1	4	150
15HORU0107	Indoor and Outdoor Gardening	3	1	4	150
15APPU0204	Pest and Disease Management of Horticultural Crops	3	1	4	150
15HORU0108	Fruit Preservation	0	2	2	100
15ACSU0201	Computer Fundamentals and Office Automation	3	1	4	150
	Electives *	3	1	4	150
		15	7	22	850
* Electives					
15AGRU0214	Bio-manure and Bio-control Agents	3	1	4	150
15HORU0109	Commercial Cultivation of Medicinal and Aromatic plants	3	1	4	150

Note:* V.P.P. marks will not be considered for the calculation of GPA & CGPA.

ABSTRACT

	Credit	Marks
I Semester	18 + 5 = 23	850
II Semester	15 + 7 = 22	850

Grand Total	33+12= 45	1700

I SEMESTER
15HORU0101- PRINCIPLES OF HORTICULTURE (3+1)

Objectives:

- 1) To learn about importance, climatic zones, nutritive, aesthetic and industrial value of horticultural crops.
 - 2) To learn about planning and layout of orchard, special horticulture techniques for horticultural crops
- I. **Introduction:** Definition – Scope and importance of horticultural crops – Nutritive, aesthetic and industrial value of horticultural crops – Climatic zones.
- II. **Abiotic factors limiting the fruit production:** Climate as a limiting factor – Effect of temperature, light, humidity and rainfall - Soil as a limiting factor – Effect of soil characters on fruit production – Nutrient supply as a limiting factor – Role of major and minor nutrients. Deficiencies of some essential elements and control measures.
- III. **Layout and site selection:** Selection of site – Preparation methods – Layout of orchards – Planting season – Planting methods
- IV. **Orchard management:** Orchard soil management – Irrigation methods – Training and pruning techniques – Causes for unfruitfulness – Role of growth regulators.
- V. **Harvesting and post harvest handling:** Maturity index – Harvesting – Handling – Packing – Grading – Transporting – Storage and marketing.

Practical:

1. Identifying of horticultural crops
2. Practicing in selection of location and site for orchard
3. Practicing in planting systems for horticultural crops
4. Practicing in methods of planting for horticultural crops
5. Practicing in methods of irrigation for horticultural crops
6. Practicing in methods of applying manures and fertilizers for horticultural crops
7. Practicing in training techniques for horticultural crops
8. Practicing in pruning techniques for horticultural crops
9. Acquiring knowledge about the application of plant growth regulators in horticultural crops
10. Practicing different methods of storage for horticultural crops
11. Acquiring knowledge about the maturity indices for major fruits
12. Acquiring knowledge about the maturity indices for major vegetables
13. Visit to major orchards.

References:

1. Bose, T.K. 1986. Fruits of India – Tropical and subtropical, Nayaprakash, Calcutta.
2. Hartmann, H.T. and D.E.Kester. 1975. Plant propagation, Englewood cliffs, New Jersey, Prentice Hall.
3. Jitendra Singh 2004, Basic Horticulture, Kalyani Publications, New Delhi.
4. Kumar, N. 1993. Introduction to Horticulture, Rajalakshmi Publications, Nagercoil.
5. Shanmugavelu, K.S. 1989. Viticulture in India. Agro Botanical Publishers.

Lecture schedule:

1. Horticulture definition
- 2-3. Scope and importance of horticultural crops
- 4-5. Nutritive value of horticultural crops
6. Aesthetic value of horticultural crops
7. Industrial value of horticultural crops
8. Climatic zones
- 9-10. Effect of temperature on horticultural crop production
- 11-12. Effect of light on horticultural crop production
13. Effect of humidity on horticultural crop production
14. Effect of rainfall on horticultural crop production
- 15-17. Effect of Soil on horticulture crop production
- 18-19. Effect of major nutrients on horticulture crop production
- 20-21. Effect of minor nutrients on horticultural crop production
- 22-23. Deficiency symptoms and control measures of major nutrients on horticultural crop production.
- 24-25. Selection of site and location for orchard
26. Preliminary operations for orchard
- 27-30. Layout of orchards
31. Planting season for horticultural crops
32. Planting methods for horticultural crops
33. Orchard soil management practices
- 34-35. Irrigation methods for orchard
- 36-39. Training and pruning techniques for horticultural crops
- 40-41. Causes for unfruitfulness of horticultural crops
- 42-43. Role of growth regulators on production of horticultural crops
44. Maturity indices, Harvesting methods and Handling of horticultural crops
- 45-46. Packing, Grading and Transporting of horticultural produces
- 47-48. Storage and marketing

Learning out come

Unit	Vague out come	Most precious outcome
I	Studying the definition , Scope and importance of horticultural crops , Nutritive, aesthetic and industrial value of horticultural crops , Climatic zones	1. Understanding the nutritive, aesthetic and industrial value of horticultural crops. 2. Understanding the climatic zones of India
II	Studying the Climate as a limiting factor, effect of temperature, light, humidity and rainfall , Soil as a limiting factor , effect of soil characters on fruit production , Nutrient supply as a limiting factor, Role of major and minor nutrients. Deficiencies of some essential elements and control measures.	1. Understanding the climate and soil characters on horticultural crop production 2. Understanding the role of major and micro nutrients on horticultural crop production
III	Studying the selection of site , preparation methods ,layout of orchards ,planting season and planting methods	1. Understanding the selection of site and location for orchard 2. Understanding the different types of layout followed in orchard.

IV	Studying the orchard soil management ,irrigation methods , training and pruning techniques ,causes for unfruitfulness and role of growth regulators.	<ol style="list-style-type: none"> 1. Understanding the drip irrigation system followed in orchard 2. Understanding the special training and pruning techniques
V	Studying the maturity index, harvesting, handling, packing , grading , transporting, storage and marketing.	<ol style="list-style-type: none"> 1. Understanding the maturity indices for major fruits and vegetables 2. Understanding the different methods of storage

I Semester

15HORU0102- NURSERY MANAGEMENT FOR HORTICULTURAL CROPS (3+1)

Objectives:

- 1) To learn about nursery techniques propagation structures and equipments followed for Horticultural crops.
- 2) To learn about sexual and vegetative propagation techniques followed for horticultural crops .

I: Nursery care management: Planning and layout of nurseries – Media for propagating and growing nursery plants – Propagation structures and equipments – Sanitation – Care and handling of nursery plants – nutrition management for nursery plants - Pest and disease management of nursery plants.

II: Sexual propagation and Asexual propagation: Introduction – Advantages and limitations of Sexual propagation and Asexual propagation. Raising nursery for seedlings-techniques, portray nursery. Propagation by specialized vegetative structures: Bulbs – tubers – Tuberous roots and stems – Corms – Rhizomes – Runners – Offsets – Suckers.

III: Propagation on its own root systems

Cuttings : Types of cuttings – use of plant growth regulators in rooting

Layering : Types of layering.

IV: Propagation on the root system of other plants:

Grafting : Methods of grafting

Budding : Methods of budding – Bud certification programme. Factors affecting graft union and formation.

V: Micro propagation: Requirements – Methods of culturing plant tissues and organs – Limitations. Advantages and Limitations.

Practical:

1. Practicing in preparation of nursery beds for raising mango and citrus root stock plants.
2. Practicing in preparation of pot mixtures
3. Practicing in potting and repotting of plants
4. Acquiring knowledge about the use of natural plant parts in vegetative propagation
5. Practicing in preparation of cuttings
6. Acquiring knowledge about the use of growth regulators and the techniques in vegetative propagation
7. Practicing in different methods of layering
8. Practicing in different methods of grafting
9. Practicing in different methods of budding
10. Practicing in propagation structures
11. Practicing in nutrition management for nursery plants
12. Practicing in Pest and disease management of nursery plants
13. Visit to micro propagation unit

References:

1. Adriance, W. and R. Brison. 1979. Propagation of Horticultural plants, Tata McGraw Hill Publishing Com. Pvt. Ltd., New Delhi.
2. Hartmann, H.T. and D.E. Kester. 1975. Plant Propagation, Englewood cliffs, New Jersey, Prentice Hall.
3. Jitendra Singh 2004, Basic Horticulture, Kalyani Publications, New Delhi.

4. N. Kumar. 1993. Introduction to Horticulture, Rajalakshmi Publications, Nagercoil.
5. Sadhu, M. 1991. Plant Propagation.

Lecture Schedule:

1. Planning of nurseries.
2. Layout of nurseries
- 3-4. Media for propagating and growing nursery plants
- 5-7. Propagation structures and equipments
8. Sanitation
9. Care and handling of nursery plants
10. Nutrition management of nursery plants
11. Pest management of nursery plants.
12. Disease management of nursery plants
- 13-14. Definition for sexual and asexual propagation and its Advantages and limitations
- 15-23. Propagation by specialized vegetative structures: Bulbs – tubers – Tuberous roots and stems – Corms – Rhizomes – Runners – Offsets – Suckers.
- 24-25. Types of cuttings
26. Use of plant growth regulators in rooting
- 27-29. Types of layering.
- 30-33. Methods of grafting
- 34-36. Methods of budding
37. Bud certification programme.
- 38-39. Factors affecting graft union and formation..
40. Micro propagation: Requirements
- 41-43. Procedure for micro propagation.
- 44-46. Methods of culturing plant tissues and organs
- 47-48. Advantages and Limitations.

Learning Outcome

Unit	Vague out come	Most precious outcome
I	Studying the planning and layout of nurseries ,media for propagating and growing nursery plants , propagation structures and equipments , sanitation , care and handling of nursery plants , nutrition management for nursery plants , pest and disease management of nursery plants.	1. Understanding the planning and lay out of nursery for horticultural crops 2. Understanding the different types of propagation structures
II	Studying the definition, advantages and limitations, propagation by specialized vegetative structures: bulbs, tubers, tuberous roots and stems, corms, rhizomes, runners, offsets, suckers.	1. Understanding the definition and advantages and disadvantages of sexual and asexual propagation. 2. Understanding the propagation by specialized vegetative structures.
III	Studying the types of cuttings , use of plant growth regulators in rooting types of layering.	1. Understanding the different types of cutting with examples 2. Understanding the different types of layering with examples

IV	Studying the methods of grafting methods of budding , bud certification programme. factors affecting graft union and formation..	1. Understanding the different types of grafting with examples 2. Understanding the different types of budding with examples
V	Studying the requirements, methods of culturing plant tissues and organs, limitations. advantages and limitations.	1. Understanding the advantages and requirements of micro propagation 2. Understanding the procedure for micro propagation.

I Semester
15HORU0103- FRUIT PRODUCTION (3+1)

Objectives:

- 1) To learn about production technology of tropical , subtropical, Arid, Humid and temperate fruit crops.
- 2) To learn about special horticulture techniques followed for fruit crops.

I. **Major tropical fruits:** Production technology of Mango, Banana, Grapes and Citrus.

II. **Minor tropical fruits:** Production technology of Papaya, Sapota, Guava.

III. **Arid zone fruits:** Production technology of Ber, Annonaceous fruits, Fig Amla, Pithecellobium, Jamun, Wood apple, Carissa and Pomegranate,

IV. **Humid zone fruits:** Production technology of Pine apple, Mangosteen, Avocado, Jack, Passion fruit and Durian.

V. **Temperate fruits:** Production technology of Apple, Plum, Peach , Pear and Strawberry

Practical:

1. Identifying and description of important varieties of fruit crops
- 2-5. Practicing propagation technique of fruit crops
- 6-7. Practicing production of fruit crops in field
- 8-9. Acquiring knowledge about the preparation of cost of cultivation for important fruit crops
- 10-11. Visit to commercial orchards.
- 12-13. Acquiring knowledge about the value added products of fruit crops

References:

- 1) Bose, T.K. 1990. Tropical and sub tropical fruits of India, Nayaprakash, Calcutta.
- 2) Hayes, W.B. 1960. Fruit growing in Indian Kitabistan Publishers.
- 3) Ranjit Singh. 1992. Fruits, National Book Trust, India.
- 4) Saini, G.S. 1997. A text book of fruit production, Aman Publishing House Ltd., Meerut, U.P.
- 5) Shanmugavelu, K.G. 1987. Production Technology of fruit crops, SBA Publications, Calcutta.

Lecture Schedule:

- 1-4. Production technology of Mango
- 5-8. Production technology of Banana
- 9-12. Production technology of Grapes
- 13-16. Production technology of Citrus
- 17-18. Production technology of Papaya
- 19-20. Production technology of Sapota
- 21-22. Production technology of Guava.
23. Production technology of Ber
- 24-25. Production technology of Annonaceous fruits
26. Production technology of Fig and Amla,
27. Production technology of Pithecellobium and jamun

- 28. Production technology of wood apple and Carissa
- 29. Production technology of Pomegranate
- 30. Production technology of Pine apple
- 31-32. Production technology of Mangosteen
- 33. Production technology of Avocado
- 34-35. Production technology of Jack
- 36-37. Production technology of Passion fruit
- 38-39. Production technology of Durian.
- 40-41. Production technology of Apple
- 42-43. Production technology of Plum
- 44-45. Production technology of Peach
- 46-47. Production technology of Pear.
- 48. Production technology of Strawberry

Learning Outcome

Unit	Vague out come	Most precious out come
I	Studying the production technology of Mango, Banana, Grapes and Citrus.	<ol style="list-style-type: none"> 1. Understanding the production technology of Mango, Banana, Grapes and Citrus. 2. Understanding the physiological disorders of mango and citrus.
II	Studying the production technology of Papaya, Sapota and Guava.	<ol style="list-style-type: none"> 1. Understanding the production technology of papaya, Sapota and guava. 2. Understanding the maturity indices of Sapota.
III	Studying the Production technology of Ber, Annonaceous fruits, Fig Amla, Pithecellobium, Jamun, Wood apple , Carissa and Pomegranate,	<ol style="list-style-type: none"> 1. Understanding the Production technology of Ber, Annonaceous fruits, Fig Amla, pithecellobium, jamun, Wood apple , Carissa and Pomegranate, 2. Understanding the different varietal characters of Amla.
IV	Studying the production technology of Pine apple, Mangosteen, Avocado, Jack, Passion fruit and Durian.	<ol style="list-style-type: none"> 1. Understanding the production technology of Pine apple, Mangosteen, Avocado, Jack, Passion fruit and Durian. 2. Understanding the pineapple propagation and planting.
V	Studying the Production technology of Apple, Plum, Peach ,Pear and Strawberry	<ol style="list-style-type: none"> 1. Understanding the Production technology of Apple, Plum, Peach, Pear and Strawberry 2. Understanding the pollinizers requirement for temperate fruit crops.

I Semester
15HORU0104-VEGETABLE PRODUCTION (3+1)

Objectives:

1. To learn about importance, classification and types of vegetable cultivation.
2. To learn about production technology of Solanaceous, Malvaceous and Leguminous, Cucurbitaceous, Crucifers, Bulb, Root, tuber and leafy vegetables

Unit I : Introduction: Definition – Importance of vegetables – Classification of vegetable crops – Types of vegetable cultivation – Crop rotation – Factors affecting vegetable cultivation.

Unit II: Production Technology of Solanaceous, Malvaceous and Leguminous vegetables

Tomato, brinjal, chillies, bhendi, garden bean and cluster bean, peas, beans,

Unit III: Production Technology Of Cucurbitaceous And Crucifers Vegetables

Gourds, Melons, Chowchow, Pumpkin, Cucumber, Gherkin, Cabbage, Cauliflower,

Unit IV: Production Technology of Bulb, Root and tuber vegetables,

Onion, Garlic, Radish, Carrot and Beetroot, Potato, Tapioca and Sweet Potato.

Unit V: Production Technology of leafy and other vegetables

Amaranthus, Celery and Lettuce, Drumstick, curry leaf, and coccinea.

Practical:

1. Identifying and description of varieties of vegetables
2. Practicing in raising nursery for vegetables
3. Practicing in planting of vegetables
4. Practicing in applying manures and fertilizers for vegetable crops
5. Acquiring knowledge about the important after cultivation practices followed for vegetables
6. Identifying of maturity indices for vegetables
7. Practicing in harvesting of vegetables
8. Acquiring knowledge about the cost of cultivation for important vegetable crops.
9. Visit to vegetable field
10. Practicing in packing of vegetables
11. Visit to vegetable market
12. Acquiring knowledge about the precision production technology of vegetables
13. Cultivation of vegetables under shade house, net house and poly house

References:

1. B. Choudhary. 1967. Vegetables, National Book Trust India, New Delhi.
2. Bose, T.K., M.G. Som and J. Kabir. 1993. Vegetable crops.
3. Jitendra Singh 2004, Basic Horticulture, Kalyani Publications, New Delhi
4. Saini, S.G. 1997. A text book of vegetable production. Aman Publishing House, Meerut, U.P.
5. Veeraraghavathatham, D., M. Jawaharlal, Seemanthini Ramadas. 1991. A guide on vegetable culture, A.E. Publication, Coimbatore.

Lecture Schedule:

1. Definition of vegetables
- 2-3. Importance of vegetables
- 4-5. Classification of vegetable crops
- 6-8. Types of vegetable cultivation
9. Crop rotation
- 10-11. Factors affecting vegetable cultivation.

- 12-13. Production technology of Tomato
- 14-15 Production technology of Brinjal
- 16-17. Production technology of Chillies
- 18 Production technology of Bhendi
- 19-21. Production technology of leguminous vegetables
- 22-23. Production technology of Gourds
- 24-25. Production technology of Melons
- 26. Production technology of Cucumber
- 27. Production technology of Chowchow
- 28. Production technology of Gherkin
- 29. Production technology of Cabbage
- 30-31. Production technology of Cauliflower
- 32-33. Production technology of Onion and Garlic
- 34-36. Production technology of Root crops
- 37. Production technology of Potato
- 38-39. Production technology of tapioca and Sweet potato
- 40. Production technology of Amaranthus
- 41. Production technology of Drumstick
- 42. Production technology of Curry leaf
- 43. Production technology of Coccinea.
- 44. Production technology of Celery
- 45. Production technology of lettuce
- 46-48. Production technology of Endive and Chicory

Learning out come

Unit	Vague Out come	Most precious out come
I	Studying the definition, Importance of vegetables, Classification of vegetable crops, Types of vegetable cultivation, Crop rotation and Factors affecting vegetable cultivation.	<ol style="list-style-type: none"> 1. Understanding the importance and classification of vegetables. 2. Understanding planning and layout of kitchen garden.
II	Studying the production technology of Tomato, brinjal, chillies, bhendi, cucurbits, garden bean and cluster bean. , peas, beans,	<ol style="list-style-type: none"> 1. Understanding the production technology of Tomato, brinjal, chillies, bhendi, cucurbits, garden bean and cluster bean, peas, beans, 2. Understanding the virus diseases and control measures for tomato and bhendi
III	Studying the production technology of Gourds, Melons, Chowchow, Pumpkin, Cucumber, Gherkin, Cabbage, Cauliflower,	<ol style="list-style-type: none"> 1. Understanding the production technology of Gourds, Melons, Chowchow, Pumpkin, Cucumber, Gherkin, Cabbage, Cauliflower, 2. Understanding the importance of ethrel spray for cucurbitaceous vegetables.
IV	Studying the production technology of Onion, Garlic, Radish, Carrot and Beetroot, Potato, Tapioca and Sweet	<ol style="list-style-type: none"> 1. Understanding the production technology of Onion, Garlic, Radish, Carrot and Beetroot, Potato, Tapioca and

	Potato.	Sweet Potato. 2. Understanding the physiological disorders of cauliflower and Carrot.
V	Studying the production technology of Amaranthus, Celery and Lettuce, Drumstick, curry leaf, and coccinea.	1. Understanding the production technology of Amaranthus, Celery and Lettuce, Drumstick, curry leaf, and coccinea. 2. Understanding the different species and varieties of amaranthus

I Semester
15HORU0105- COMMERCIAL FLOWER CULTIVATION (3+1)

Objectives:

- 1) To learn about production technology of commercial flower crops.
- 2) To learn about cut flowers, floral concrete extraction and value added products from commercial flower crops.

- I. Production technologies of Scented Rose, Jasmine
- II. Production technologies of Chrysanthemum, Marigold and Tuberose.
- III. Production technologies of Crossandra, Celosia, Gamphrena and Nerium
- IV. Production technologies of Gladiolus, Anthurium, Carnation, Dutch rose, Cut Chrysanthemum and Orchids
- V. Production technologies of Aster, Dahlia and Gerbera.

Practical:

1. Identifying and description of varieties of commercial flower crops
2. Practicing in propagation of commercial flower crops
3. Practicing in planting of commercial flower crops
4. Practicing in picking of commercial flower crops
5. Practicing in packing of commercial flower crops
6. Visit to flower gardens
7. Visit to flower markets
8. Visit to essential oil extraction unit
9. Visits to orchidarium
10. Acquiring knowledge about the preparing cost of cultivation for chrysanthemum and marigold
11. Acquiring knowledge about the Preparing cost of cultivation for jasmine and tuberose
12. Visit to flower field
13. Visit to flower field

References:

1. Arora.,J.S.2007, Introductory Ornamental Horticulture, Kalyani Publishers, New Delhi.
2. Bose, T.K. and L.P. Yadav. 1989. Commercial flowers – Nayaprakash, Calcutta.
3. Chadha, K.L. and B. Choudhury. 1997. Ornamental Horticulture in India, ICAR, New Delhi.
4. Randhava, G.S. and A. Mukhopadhyay. 1986. Floriculture in India, Allied Publishers Pvt. Ltd., New Delhi.
5. Vishnu swarup ,Garden flowers, ICAR Publications, New Delhi

Lecture Schedule:

- 1-5. Production technology of Rose
- 6-10. Production technology of jasmine
- 11-13. Production technology of chrysanthemum
- 14-15. Production technology of marigold

- 16-17. Production technology of tuberose
- 18-19. Production technology of crossandra.
- 20-21. Production technology of celosia
- 22-23. Production technology of gamphrena.
- 24-25. Production technology of nerium
- 26-27. Production technology of gladiolus
- 28-29. Production technology of anthurium
- 30-31. Production technology of carnation
- 32-34. Production technology of dutch rose
- 35-37. Production technology of cut chrysanthemum
- 39-42. Production technology of orchids
- 43-44. Production technology of aster
- 45-46. Production technology of dahlia
- 47-48. Production technology of gerbera

Learning outcome

Unit	Vague out come	Most precious out come
I	Studying the production technology of scented rose, jasmine	<ol style="list-style-type: none"> 1. Understanding the production technology of scented rose, jasmine 2. Understanding the floral concrete extraction from jasmine flowers
II	Studying the production technology of chrysanthemum, marigold and Tuberose.	<ol style="list-style-type: none"> 1. Understanding the production technology of chrysanthemum, marigold and Tuberose. 2. Understanding weed management in tube rose
III	Studying the production technology of crossandra, celosia, gamphrena and nerium	<ol style="list-style-type: none"> 1. Understanding the production technology of crossandra, celosia, gamphrena and Nerium 2. Understanding the different types of Chrysanthemum and Marigold.
IV	Studying the Production technology of Gladiolus, Anthurium, carnation, dutch rose, cut chrysanthemum	<ol style="list-style-type: none"> 1. Understanding the Production technology of Gladiolus, Anthurium, carnation, dutch rose, cut chrysanthemum 2. Understanding suitable gladiolus cultivars for cut flower production.
V	Studying the Production technology Aster, Dahlia and Gerbera.	<ol style="list-style-type: none"> 1. Understanding the Production technology of Aster, Dahlia and Gerbera. 2. Understanding vase life and longevity of cut flowers.

I Semester
15AEXU0110-COMMUNICATION FOR MANAGEMENT (3+0)

Objectives:

1. To understand the concept and types of communication and its models
2. To learn the various management concepts and models
3. To understand the use of communication as a management tool.

I. Communication: Communication process – meaning, nature, scope, purpose, importance, elements, forms, types and models – Aristotle, Lasswell, Berlo, Shannon and Weaver and Leagans, Elements in communication process-description. Problems and barriers in communication.

II. Organization and management: Organizations – meaning – nature, concepts and types of organizations – mechanistic and organic, formal and informal, hybrid organizations – project, task force and matrix, Agricultural farms as formal organizations – management – meaning and functions, evolution of management thought and pioneers of management field.\

III. Concepts of management: Systems of management – four different systems, POSDCORB theory of management – Managerial role in an organization, scalar principle, delegation of authority, supervision, span of supervision, coordination, centralization Vs decentralization and decision making.

IV. Management communication: Meaning, functions and types of organizational communication and their importance in the management of farms. Role and significance of communication to management – Manager as a communicator and his communication settings – communication as a management tool – Problems in management communication and suggestions to overcome.

V. Organizational development: Organizational development – meaning, characteristics, objectives, process and benefits – Some motivational tools and techniques – Management information system – features, types, steps and benefits.

References:

1. Banerjee, M. 1996. Essentials of modern managements. Indian Book Distributing Company, New Delhi.
2. Berlo, David K. 1961. The process of communication,
3. Dahama, O.P. and O.P. Bhatnagar. 1996. Education and Communication for Development, Oxpord, IBH PUBLISHING Co.Ltd, NewDelhi
4. Ray, G.L. 1991. Extension communication and management. Naya Prakash, Calcutta.
5. Seetharaman, Netaji. R., et.al. 1990. A Manual on Audio-visual Aids.

Lecture Schedule:

- 1 &2- Communication: Communication process – meaning, nature, scope, purpose, importance, elements, forms,
3. Types of communication
- 4 &5- Models – Aristotle, Lasswell, Berlo, Shannon and Weaver and Leagans,
- 6&7- Elements in communication process- description.
- 8&9- Problems and barriers in communication.
10. Organizations – meaning – nature, concepts.
- 11to13- Types of organizations – mechanistic and organic, formal and informal, hybrid organizations – project, task force and matrix,
- 14- Agricultural farms as formal organizations

- 15- Management – meaning and functions,
- 16 to18- Evolution of management thought and pioneers of management field.
- 19&20- Systems of management – four different systems,
- 21- POSDCORB theory of management.
- 22- Managerial role in an organization,
- 23- Scalar principle.
- 24- Delegation of authority.
- 25&26- Supervision and span of supervision.
- 27- Coordination.
- 28- Centralization Vs decentralization
- 29- Decision making.
- 30&31- Organizational communication- Meaning, functions and importance.
- 32&33- Types of organizational communication and their importance in the management of farms.
- 34- Role and significance of communication to management.
- 35&36- Manager as a communicator and his communication settings.
- 37- Communication as a management tool
- 38- Problems in management communication and suggestions to overcome.
- 39 to 42-Organizational development – meaning, characteristics, objectives, process and benefits
- 43- Some motivational tools and techniques.
- 44 to 48-Management information system – features, types, steps and benefits.

Learning out comes		
Unit	Vague out come	Most precious out come
I.	Studying the communication process	<ol style="list-style-type: none"> 1. Understanding the concepts of communication 2. Learning the models, elements of communication process 3. Understanding the problems in the communication process
II.	Learning about the organizations	<ol style="list-style-type: none"> 1. Learning about the features and types of organizations 2. Understanding the agricultural farms as organizations 3. Understanding the meaning and functions of management.
III.	Learning about the various management concepts	<ol style="list-style-type: none"> 1. Understanding the various systems of management 2. Understanding the various management concepts
IV.	Studying about the organizational communication	<ol style="list-style-type: none"> 1. Learning about the types of organizational communication and their application 2. Understanding the application of communication as a management tool
V.	Learning about the organizational development	<ol style="list-style-type: none"> 1. Understanding the meaning, process and benefits of organizational development 2. Learning about the features, types and benefits of management information system.

II Semester

15HORU0106-SPICES, CONDIMENTS AND PLANTATION CROPS (3+1)

Objectives:

- 1) To learn about production technology and processing of major, tree and seed spices.
- 2) To learn about production technology and processing technology of plantation crops and beverage crops

I. **Major spices:** Production technologies and processing of Cardamom, Pepper, Ginger and Turmeric.

II. **Tree spices:** Production technologies and processing of Clove, Nutmeg, Cinnamon, Garcinia

III. **Seed spices:** Production technologies of Coriander, Fennel, Fenugreek and Cumin.

IV. **Plantation crops:** Production Technologies of Rubber, Cashewnut, Arecanut, Coconut and Oil palm.

V. **Beverage crops:** Production technologies and processing of Coffee, Tea and cocoa.

Practical:

1. Identifying and description of varieties
2. Practicing in propagation of ginger and Turmeric
3. Practicing in propagation of seed spices like coriander and fenugreek
4. Practicing in raising nursery.
5. Practicing in after cultivation
6. Practicing in training
7. Practicing in pruning
8. Practices in fertilization
9. Visit to plantations to study the cultivation methods and processing.
- 10-12. Visit to Horticulture Research Station
13. Herbarium collection

References:

1. Kumar, N. Md. Abdul Khadar, P.Rangasami and I.Irulappan. 1993. Introduction to spices, plantation crops, medicinal and aromatic plants, Rajalakshmi Publishers, Nagercoil – 3.
2. Shanmugavelu, K.G. and N.Madhava Rao. 1987. Spices and plantation crops, India Book House, New Delhi.
3. Singh, V.B. and Kirtisingh. 1996. Spices, New age International Limited Pvt. Publishers, New Delhi.
4. Muhanan K.V. 2006, Essentials of Plantation Science, Perte Books Publishers and Distributors, Calicut, Kerala.
5. Crop Production guide 1999, TNAU & Dept of Agriculture Publication.

Lecture Schedule:

- 1-3. Production technology of cardamom
4. Processing technology of Cardamom
- 5-7. Production technology of Pepper
8. Processing technology of Pepper
- 9-11. Production technology of Ginger
12. Processing technology of Ginger
- 13-15. Production technology of Turmeric.
16. Processing technology of Turmeric
- 17-18. Production technology of Clove
19. Processing technology of Clove

- 20-21. Production technology of Nutmeg
22. Processing technology of Nutmeg
- 23-24. Production technology of Cinnamon.
25. Processing technology of Cinnamon
- 26-27. Production technology of Garcinia
28. Production technology of Coriander
29. Production technology of Fennel
30. Production technology of Fenugreek
31. Production technology of Cumin.
- 32-33. Production technology of Rubber
34. Processing technology of Rubber
35. Production technology and processing of Cashewnut,
36. Production technology and processing of Arecanut
- 37-38. Production technology and processing of Coconut
39. Production technology and processing of Oil palm.
- 40-42. Production technology of Coffee
43. Processing technology of Coffee
- 44-46. Production technology of Tea.
47. Processing technology of Tea.
48. Production technology and processing of Cocoa

Learning out come

Unit	Vague out come	Most precious out come
I	Studying the production technology and processing of Cardamom, Pepper, Ginger and Turmeric.	<ol style="list-style-type: none"> 1. Understanding the production technology of Cardamom, Pepper, Ginger and Turmeric. 2. Understanding the processing of Cardamom, Pepper, Ginger and Turmeric.
II	Studying the production technology and processing of Clove, Nutmeg, Cinnamon and Garcinia.	<ol style="list-style-type: none"> 1. Understanding the production technology of Clove, Nutmeg, Cinnamon and Garcinia. 2. Understanding the processing technology of Clove, Nutmeg, Cinnamon.
III	Studying the production technology of Coriander, Fennel, Fenugreek and Cumin.	<ol style="list-style-type: none"> 1. Understanding the production technology of Coriander, Fennel, Fenugreek and Cumin. 2. Understanding the propagation technique followed for coriander.
IV	Studying the production Technology of Rubber, Cashewnut, Arecanut, Coconut and Oil palm.	<ol style="list-style-type: none"> 1. Understanding the production Technology of Rubber, Cashewnut, Arecanut, Coconut and Oil palm. 2. Understanding rubber tapping technique
V	Studying the production technology and processing of Coffee , Tea and Cocoa.	<ol style="list-style-type: none"> 1. Understanding the production technology of Coffee , Tea and Cocoa. 2. Understanding the processing of coffee, tea and Cocoa.

II Semester
15HORU0107-INDOOR AND OUTDOOR GARDENING (3+1)

Objectives:

- 1) To learn about importance, history, development, types of garden and garden components.
- 2) To learn about landscaping principles, lawn making and principles of flower arrangement.

- I. **Introduction:** Importance – History and development of gardening – Hindu style – Buddhist garden – Moghul garden – Japanese garden – British garden.
- II. **Garden Plant components :** Arboretum – Shrubbery — Topiary – Edge – Hedge – Terrace garden, Flowering annuals and herbaceous perennials – Climbers and creepers – Ornamental palms – Ferns.
- III. **Garden Non plant components :** Rock garden – Water garden- Fountain- Statue- Arches- Pergola- Urns- Tubs.
- IV. **Landscaping:** Principles of landscaping – Lawn and lawn maintenance – Principles, planning and execution of private garden – Public garden and factory garden.
- V. **Indoor gardening:** Decorative plants – Bonsai – Principles of flower arrangement – Decoration with indoor plants for conference hall, living room, dining hall and verandah flower arrangement.

Practical:

1. Identifying of important ornamental trees
2. Identifying of important shrubs
3. Identifying of important climbers and creepers
4. Identifying of important edge and hedge plants
5. Identifying of important ferns, cacti and succulents
6. Practicing in lawn making
7. Practicing in lawn maintenance
8. Practicing in planning and layout of home gardens
9. Practicing in planning an layout of public gardens
10. & 11. Acquiring knowledge about the flowering annuals with reference to raising nursery, pricking, tipping and disbudding and preparation of main field and transplanting
12. Visit to botanical garden
13. Visit to Park

References:

1. Gopal Samy Iyengar ,1990, Complete Gardening In India ,IBH, India
2. Indoor gardening, Vishnu Swarup, ICAR, New Delhi.
3. Nambison, K.M.P. 1992. Design elements of landscape gardening. Oxford and IBH Publications, New Delhi.
4. Pratibha and P.Trivedi, 1990. Beautiful shrubs, ICAR, New Delhi.
5. Pratibha and P.Trivedi. 1987. Home Gardening. ICAR, New Delhi.

Lecture Schedule:

1. Importance of gardening
- 2-4. History and development of gardening
5. Hindu style garden
6. Buddhist garden
- 7-8. Moghul garden
9. Japanese garden
10. British garden.
- 11-12. Arboretum
- 13-14. Shrubbery
15. Topiary
- 16-17. Edges and Hedges
- 18-19. Terrace Garden
- 20-21. Flowering annuals
22. Herbaceous perennials
23. Climbers and creepers
24. Ornamental palms
25. Ferns
- 26-27. Rock garden
- 28-29. Water garden
- 30-31. Fountain and Statue
- 32-33. Arch and Pergola
34. Principles of landscaping
- 35-36. Land making methods
37. Lawn grasses
- 38-39. Lawn maintenance
40. Principles, planning and execution of Factory garden.
41. Principles, planning and execution of private garden
42. Principles, planning and execution of public garden
- 43-44. Bonsai
45. Principles of flower arrangement
46. Decoration with indoor plants for conference hall
47. Decoration with indoor plants for living room
48. Decoration with indoor plants for dining hall

Learning out come

Unit	Vague outcome	Most precious out come
I	Studying the Importance, History and development of gardening, Hindu style , Buddhist garden, Moghul garden, Japanese garden and British garden.	1). Understanding the Importance, History and development of gardening. 2). Understanding the different features of various gardens.
II	Studying the Arboretum – Shrubbery — Topiary – Edge – Hedge – Terrace garden, Flowering annuals and herbaceous perennials – Climbers and creepers – Ornamental palms – Ferns.	1) Understanding the suitable plants for topiary, hedges and edges. 2) Understanding the classification of flowering annuals

III	Studying the Rock garden – Water garden- Fountain- Statue- Arches- Pergola- Urns- Tubs.	1). Understanding the suitable plants for rock and water garden. 2). Understanding the garden non- plant components
IV	Studying the Principles of landscaping, Lawn and lawn maintenance, Principles, planning and execution of private garden and Public garden and factory garden.	1). Understanding the landscaping principles. 2). Understanding lawn making method and maintenance.
V	Studying the Decorative plants, Bonsai, Principles of flower arrangement. Decoration with indoor plants for conference hall, living room, dining hall and verandah flower arrangement.	1). Understanding the flower arrangement principles. 2) Understanding the difference steps involved in making bonsai plants.

II Semester
15APPU0204-PEST AND DISEASE MANAGEMENT OF
HORTICULTURAL CROPS (3+1)

Objective:

To facilitate the students to learn and understand the Horticultural crops pests and disease symptoms and their management practices.

Theory

Study of important and common pests and diseases with reference to the life cycle, symptoms and control measures of the following horticultural crops.

Unit I: Fruit crops: Mango, banana, grapes, citrus, ber, sapota, guava, pomegranate, papaya, apple, peach, pear and plum.

Unit II: Vegetable crops: Brinjal, bhendi, chillies, crucifers, cucurbits, potato, tomato and leafy vegetables.

Unit III: Flower crops: Jasmine, crossandra, marigold and rose.

Unit IV: Plantation crops: Tea, coffee and rubber.

Unit V: Spices and condiments: Cardamom, pepper, turmeric, ginger and coriander.

Practical:

1. Identification and observation of pests and diseases of fruit crops
2. Identification and observation of pests and diseases of vegetables crops
3. Identification and observation of pests and diseases of flowers crops
4. Identification and observation of pests and diseases of plantation crops
5. Identification and observation of pests and diseases of species and condiments
6. Collection, preservation and rearing of at least 10 insect pest which cause damage to horticultural crops
7. Submission of 20 specimens showing the damages caused by insects and diseases
- 8-9. Visit to nearby farmer's fields to learn the field problems related to pests and diseases
- 10-13 Field visits to commercial orchards.

References:

1. Govindasamy, C.V. and M.N. Alagianagalingam. 1986. Plant Pathology, Popular Book Depot, Chennai.
2. Kumar and Nigam. 1989. Economic and applied entomology, Emkay Publications, New Delhi.
3. Mehtotra, R.S. 1988. Plant pathology, Tata McGraw Hill Publishing Company, Ltd., New Delhi.
4. Nair, M.R.G.K. 1986. Insects and mites of crops in India, ICAR Publications, New Delhi.
5. Pradhan, S. 1983. Agricultural entomology and pest control, ICAR Publications, New Delhi.

LECTURE SCHEDULE:

Etiology, symptoms, mode of spread, survival, epidemiology and management of

- 1-2. Pests and Diseases of Mango
- 3-4. Pests and Diseases of Banana.
- 5-6. Pests and Diseases of citrus.
- 7-8. Pests and Diseases of Grapes.
- 9-10. Pests and Diseases of Guava.
- 11-12. Pests and Diseases of sapota.
- 13-14. Pests and Diseases of pomegranate.
15. Pests and Diseases of papaya.
- 16-17. Pests and Diseases of apple, pear, plum and peach.
- 18-19. Pests and Diseases of tomato.
- 20-21. Pests and Diseases of brinjal
- 22-23. Pests and Diseases of bhendi.
- 24-25. Pests and Diseases of cucurbits.
- 26-27. Pests and Diseases of crucifers.
- 28-29. Pests and Diseases of potato.
30. Pests and Diseases of Leafy vegetables.
- 31-32. Pests and Diseases of Jasmine,
- 33-34. Pests and Diseases of rose and Marigold
- 35-36. Pests and Diseases of crossandra.
- 37-38. Pests and Diseases of pepper
- 39-40. Pests and Diseases of cardamom.
- 41-42. Pests and Diseases of tea
- 43-44. Pests and Diseases of coffee
- 45-46. Pests and Pests and Diseases of turmeric and ginger.
47. Pests and Diseases of coriander .
- 48-. Field visits.

Learning out come		
Unit	Vague out come	Most precious out come
I.	Studying the Pests and Diseases of Fruit crops.	1. Understanding the basic symptoms Pests and diseases Fruit crops 2. Understanding the important Pests and diseases management methods in Fruit crops
II.	Studying the Pests and Disease of Vegetables	1. Understanding the basic symptoms Pests and diseases of Vegetables 2. Understanding the important Pests and diseases management methods in vegetables
III.	Studying the Pests and Diseases of Spices & Condiments	1. Understanding the basic symptoms Pests and diseases of Spices & Condiments 2. Understanding the important Pests and diseases management methods in Spices & Condiments

IV.	Studying the Pests and Diseases of Plantation crops	<ol style="list-style-type: none"> 1. Understanding the basic symptoms Pests and diseases of Plantation crops 2. Understanding the important Pests and diseases management methods in Plantation crops
V.	Studying the Pests and Diseases of Ornamental crops	<ol style="list-style-type: none"> 1. Understanding the basic symptoms Pests and diseases of Ornamental crops 2. Understanding the important Pests and diseases management methods in Ornamental crops

II Semester
15HORU0108- FRUIT PRESERVATION (0+2)

Objectives :

1. To learn about importance and types of preservation for fruits
 2. To learn about value added products from fruits
- I. **Importance of fruit preservation** – Types of preservation – Temporary and permanent methods - Quality Standards – Regulations – Organic Production.
- II. **Preservation of squashes (Grapes, Orange)** – Selection of fruits – Preparation and preservation methods.
- III. **Preservation of crushes (Mango, Pineapple)** – Selection of fruits – Preparation and preservation methods.
- IV. **Preservation of Jams, Jellies - (Mixed fruit, Guava)** – Selection of fruits – Extraction of Pectin and preservation methods
- V. **Preservation of pickles** – (Tomato, Garlic, Mango) – Tomato sauce – FPO rules and regulations etc.

References:

1. Jitendra Singh 2004, Basic Horticulture, Kalyani Publications, New Delhi.
2. Kumar, N. 1993. Introduction to Horticulture, Rajalakshmi Publications, Nagercoil.
3. Premlata Mullick, 2000. Text Book of Home Science, Kalyani Publishers, New Delhi
4. Sri Lakshmi.N. 2007, Food Science, New Age International (P) Ltd., Publishers, New Delhi.
5. [WWW.newage Publishers .Com](http://WWW.newagePublishers.Com)

Practical:

1. Practicing the preparation and preservation of grapes squashes
2. Practicing the preparation and preservation of Orange squashes
3. Practicing the preparation and preservation of Mango crushes
4. Practicing the preparation and preservation of pineapple crushes
5. Practicing the preparation and preservation of Guava Jams, Jellies
6. Practicing the preparation and preservation of mixed fruits Jams, Jellies
7. Practicing the preparation and preservation of Tomato pickles
8. Practicing the preparation and preservation of Tomato sauce
9. Practicing the preparation and preservation of Mango pickles
10. Practicing the preparation and preservation of Garlic pickles
11. Acquiring knowledge about the quality standards for fruits
12. Acquiring knowledge about the FPO rules and regulations
13. Visit to fruits preservation unit

II SEMESTER

15ACSU0201- COMPUTER FUNDAMENTALS AND OFFICE AUTOMATION (3+1)

OBJECTIVES

- To understand the basic concepts of computers
- To develop applications using MS Word, MS Excel and MS Powerpoint.

UNIT I: Definition of a computer - Computer terminologies - Anatomy of a computer - Generations of computers - Types of computers- Types of operating system - Types of programming languages - assembler - translator - compiler – cross compiler
[11 Hrs]

UNIT II: Input devices - Output devices - Storage devices - Source data entry devices. [8 Hrs]

UNIT III: MS-Word: Introduction - features - Document creation - Document editing: cursor movements - selecting text - copying text - moving text - finding and replacing text - Spelling and Grammar - Page setup - Mail Merge - Table creation. [8 Hrs]

UNIT IV: MS-Excel : Introduction - Advantages & applications - Organization of workbook - Editing a worksheet - Range - Formatting worksheet - Chart: creation - changing type - Print options - Built-in functions. [7 Hrs]

UNIT V: MS-Power Point: Introduction - features - creating presentation - viewing - saving and close presentation - Changing Layout - Changing Designs - Slide transition – Adding animation effects - inserting table, charts, pictures, clipart in presentation. [8 Hrs]

Reference Books:

1. Fundamentals of Information Technology, S.K. Bansal, A.P.H. Publishing company, New Delhi, 2002.
2. 2007 Microsoft Office System step by step, Joyce Cox, Joan Preppernau, Steve Lambert and Curtis Frye, 2007

LECTURE SCHEDULE

Units	Topics Covered	Hours
UNIT-I	• Definition of a computer –Origin of Computer- Characteristics	1
	• Computer terminologies	2
	• Anatomy of a computer - generations of computers	1
	• Types of computers- types of operating system	2
	• Types of programming languages	2
	• Assembler - translator	1
	• Compiler – cross compiler	1
	• Discussion on recent trends and	1
	11 Hours	

	technology	
UNIT-II	• Input devices –Keyboard-mouse-pointing devices	2
	• Output devices - printers- plotters-monitors	2
	• Storage devices - Floppy – Compact disk – external Hard disk – Pen drives – Flash Drive	2
	• Source data entry devices – Digital camera – Scanners – Voice Recognition System – fax machine - microphone	1
	• Surprise test/ slip test	1
		8 Hours
UNIT-III	• MS-Word: Introduction - features	1
	• Document creation - Document editing: cursor movements	1
	• selecting text - copying text - moving text	1
	• finding and replacing text - Spelling and Grammar	1
	• Page setup - Table creation.	1
	• Mail Merge	2
	• Test on MS word shortcut keys	1
		8 Hours
UNIT-IV	• MS-Excel : Introduction - Advantages & applications -	1
	• Organization of workbook - Editing a worksheet -	1
	• Range - Formatting worksheet -	1
	• Chart: creation - changing type - Print options	1
	• Built-in functions.	2

OUTCOMES

Students should be able to

- Know the basic computer concepts.
- Understand the basic hardware devices.
- Create document in MS Word.
- Draw chart using MS Excel.
- Design presentation using MS Power point

Electives
II SEMESTER

15AGRU0214-BIO-MANURES AND BIO-CONTROL AGENTS (3+1)

Objectives:

1. To teach the importance of bio-manures and bio-control agents
 2. To expose the students to the application of various bio-manures and bio-control agents
 3. To impart the skill in the preparation and application of various composts and organic nutrient sprays
- I. **Introduction:** Adverse Effects of Modern Agricultural Practices on and off the Farm- Impact of High Technology Agriculture-its contribution to Greenhouse Effect, Global Warming and Climate Change. Eco-Friendly Alternative Farming Techniques- Advantages of Organic Farming- Role of Bio-Manures in Soil Fertility and Soil Micro Flora. Bulky organic manures- types and usage. Concentrated organic manures- types and usage.
 - II. **Bio-fertilizers and Organic nutrient sprays:** Bio-fertilizers- definition, types and methods of application. Liquid bio-fertilizers-benefits, characteristics, types- Rhizobium, azospirillum, azotobacter- methods of application and dosage. Mass production and application of Mycorrhizae, Cyanobacteria, Azolla. Organic nutrient sprays- meaning, advantages, types- panchakavya, dasakavya, jeevamirtha, ganajeevamirtha, beejamirtha, amirthakaraisal, fish gunabajala, egg sap.
 - III. **Composts and Composting techniques:** Composts- meaning, necessity, advantages and disadvantages, benefits and uses. Principles of composting. Types of composting-aerated Varanshi, Indore, Bangalore methods. Night soil composting, coir composting, Fortified, pit or trench, sugarcane trash, enriched, NADEP methods. Vermi- composting- advantages, nutritive value, types, methods, suitable spp., requirements, vermiculture bed, worm food, techniques involved, vermiwash.
 - IV. **Bio-control agents:** Bio-control agents- definition, advantages, disadvantages, differences, types and characteristics. Parasites- production technologies of Trichogramma. Parasitoids- major types. Entomopathogenic virus, bacteria and fungi. Sex pheromone traps. Predators- definition, features and characteristics, mechanism, types, methods of predation. Important predators. Biological and taxonomical relationships of insect predators. Conserving parasites and predators.
 - V. **Green manuring and Greenleaf Manuring:** Meaning, objectives, advantages and disadvantages. Green manures-desirable characteristics, types, nutrient contents. Greenleaf manures-desirable characteristics, types, nutrient contents. Agronomy of major Green manure crops.

Practical:

1. Studies on different bio-manures and its physical properties
2. Decomposition of organic matter and CO₂ evolution
3. Preparation of enriched compost
4. Preparation of Coir compost
5. Preparation of Vermi- compost
6. Preparation and application of Panchakavya and Dasakavya
7. Preparation and application of Jeevamirtha and Ganajeevamirtha
8. Preparation and application of Beejamirtha
9. Preparation and application of Fish gunabajala and egg sap

10. Preparation of NPV and CPV
11. Methods of application of bio-fertilizers
- 12 & 13. Visit to organic fields.

References:

- 1) Balekar, Subash (2011). Zerobudget Farming
- 2) Brady, N.C. 1985. The Nature and properties of soils. Eurasia Publishing House (P) Ltd., New Delhi.
- 3) Dilip Kumar Das – 2000. Introductory Soil Science, Kalyani Publishers, New Delhi . 111 002.
- 4) Palaniappan, S.P and K. Annadurai (1999), Organic Farming. Scientific Publishers (India),Jodhpur
- 5) Palaniappan, SP. and K. Annadurai. 1999. Organic farming: Theory and Practice, Scientific Publishers, Jodhpur.
- 6) Sahai, 1999. Fundamentals of soil. Kalyani Publishers, New Delhi.
- 7) Sharma K. Arun, 2002, A Hand Book of Organic Farming Agrobios (India) Jodhpur.
- 8) Subba Rao and Bhakya Raj, 1986. Agricultural Microbiology, Eastern Economy
- 9) Vyas, S.C., Smriti Vyas, Sameer Vyas and H.A. Modi. 1998. Biofertilizers and Organic farming, Akta Prakashan, Nadiad, pp. 252.

Lecture Schedule:

- | | |
|-----------|---|
| 1 to 3- | Adverse Effects of Modern Agricultural Practices on and off the Farm- Impact of High Technology Agriculture-its contribution to Greenhouse Effect, Global Warming and Climate Change. |
| 4&5- | Eco-Friendly Alternative Farming Techniques- Advantages of Organic Farming- Role of Bio-Manures in Soil Fertility and Soil Micro Flora. |
| 6&7- | Bulky organic manures- animal products, ash, agricultural and agro-industrial wastes, green manures, composts. |
| 8&9- | Concentrated organic manures-oil cakes, fish manures, bone and blood meal cow horn manures. |
| 10. | Bio-fertilizers- definition, types and methods of application. |
| 11 &12. | Liquid bio-fertilizers- benefits, characteristics, types- Rhizibium, azospirillum azotobacter-methods of application and dosage. |
| 13&14- | Mass production and application of Mycorrhizae, Cyanobacteria, Azolla. |
| 15 to 18- | Organic nutrient sprays- meaning, advantages, types-panchakavya, dasakavya, jeevamirtha, ganajeevamirtha, beejamirtha, amirthakaraisal, fish gunabajala, egg sap. |
| 19 &20- | Composts and composting techniques: Composts- meaning, necessity, advantages and disadvantages, benefits and uses. Principles of composting. |
| 21 to 23- | Types of composting-aerated windrow, aerated static pile composting, Varanshi, Indore, Bangalore methods. Night soil composting, coir composting. |
| 24&25- | Fortified composting, EM based quick composting pit or trench composting, sugarcane trash composting, enriched compost, bin composting, NADEP compost. |
| 26 to 28- | Vermi- composting-advantages, nutritive value, types, methods, suitable spp., requirements, vermiculture bed, worm food, techniques involved, vermiwash. |
| 29&30- | Bio-control agents- definition, advantages, disadvantages, differences, types and characteristics. |

- 31 to 33- Parasites- production technologies of Trichogramma. Parasitoids- major types.
 34- Entomopathogenic virus-Ha NPV, SI NPV-production an field application.
 35- Entomopathogenic bacteris- Bacillus, Pseudomonas-application.
 36- Entomopathogenic fungi- types.
 37- Fungal antagonists- Trichoderma- production and application.
 38- Sex pheromone traps-advantages, production and application.
 39 - Predators- definition, features and characteristics, mechanism, types, methods of predation.
 40&41- Important predators- Vedalia, Cryptolaemus, Green Lacewing, Lady beetle, Ground beetle, True bugs, Damsel bugs, Stink bugs, Parasitic wasps. Biological and taxonomical relationships of insect predators. Conserving parasites and preadtors.
 42- Green manuring and Greenleaf manuring- meaning, objectives, advantages and disadvantages.
 43- Green manures-desirable characteristics, types, nutrient contents.
 44- Green leaf manures-desirable characteristics, types, nutrient contents.
 45 to 48- Agronomy of Green manure crops- Sithagathi, Daincha, Manila agathi, Sunnhemp, Wild indigo, Pillipesara. Management of Green manuring.

Learning out comes		
Unit	Vague out come	Most precious out come
I.	Studying the eco-friendly alternative farming technologies	<ol style="list-style-type: none"> 1. Understanding the impact and adverse effects of modern agricultural techniques 2. Understanding the necessity and importance of various eco-friendly alternative farming technologies
II.	Learning about the bio-fertilizers and organic nutrient sprays	<ol style="list-style-type: none"> 1. Understanding the various types of bio-fertilizers and their methods of application 2. Acquiring the skill in the preparation and application of various organic nutrient sprays.
III.	Learning about the various types of composts and composting techniques	<ol style="list-style-type: none"> 1. Understanding the mechanism involved in the preparation of various types of composts and composting techniques
IV.	Studying about the various types of bio-control agents	<ol style="list-style-type: none"> 1. Understanding the importance of use of bio-control agents in pest control. 2. Understanding the mechanism of action involved in the pest control through the use of bio-control agents
V.	Learning about the different types of green manures and Greenleaf manures	<ol style="list-style-type: none"> 1. Understanding the necessity and importance of application of green manures and Greenleaf manures 2. Learning about the cultivation and application of green manures and Greenleaf manures.

II Semester-Electives
15HORU0109-COMMERCIAL CULTIVATION OF MEDICINAL AND
AROMATIC PLANTS (3+1)

Objectives:

1. To learn about production Technology of Medicinal, Aromatic and Indigenous herbs
 2. To learn about processing Technology of Medicinal, Aromatic and Indigenous herbs
- I. **Introduction:** Importance and scope of medicinal and aromatic plants – Global Scenario – Species extinction – conservation techniques – distillation methods of essential oils.
 - II. **Production technology for medicinal plants:** Medicinal yam – Senna – Fox glove – Sarpagandha.
 - III. **Production technology for medicinal plants:** Periwinkle – Isubgol – Belladonna – Ipecac.
 - IV. **Production technology for aromatic plants:** Lemon grass – Palmarosa – Citronella - Vetiver – Geranium – Patchouli.
 - V. **Indigenous minor herbs:** Role of indigenous herbs in disease control – Indigenous herbs and their curative properties – Important herbal formulations.

Practical:

1. Identifying and description of varieties of Medicinal plants
2. Identifying and description of varieties of Aromatic plants
3. Practising in raising Nursery for Medicinal plants
- 4 – 5. Practising in cultivation methods of important Medicinal plants
- 6 – 7. Practising in cultivation methods of important Aromatic plants
8. Visit to Ayurvedic unit, Gandhigram trust
- 9 – 10. Visit to HRS, kodaikanal
11. Visit to an Oil Extraction Factory
12. Identifying of important Indigenous herbs
13. Acquiring knowledge about the important herbal formulations

References:

1. Dr.S.K. Jain, Medicinal Plants. National Book Trust, India, New Delhi.
2. Kumar, N. 1993. Introduction to Horticulture, Rajalakshmi Publications, Nagercoil.
3. Kumar, N., D.Abdul Khadar, P. Rangasami and T.Irulappan. 1993. Introduction to spices, plantation crops, medicinal and aromatic plants, Rajalakshmi Publications, Nagercoil – 3.

Lecture schedule:

- 1 – 2. Importance and scope of Medicinal plants
- 3 – 4. Importance and scope of Aromatic plants
- 5 – 6. Global Scenario for Medicinal and Aromatic plants
- 7 – 8. Species extinction for Medicinal and Aromatic plants
- 9 – 10. Conservation Techniques for Medicinal and Aromatic plants

- 11 – 12. Distillation methods of essential oils from Medicinal and Aromatic plants
- 13 – 14. Production Technology of Medicinal yam
- 15 – 16. Production Technology of Senna
- 17 – 18. Production Technology of Fox glove
- 19 – 20. Production Technology of Sarpagandha
- 21 – 22. Production Technology of periwinkle
- 23 – 24. Production Technology of Isubgol
- 25 – 26. Production Technology of Belldona
- 27 - 28. Production Technology of Ipecac
- 29 – 30. Production Technology of Lemon grass
- 31 – 32. Production Technology of Palmarosa
- 33 – 34. Production Technology of Citronella
- 35 – 36. Production Technology of Vetiver
- 37 – 38. Production Technology of Geranium
- 39 – 40. Production Technology of Patchouli
- 41 – 43. Role of Indigenous herbs in disease control
- 44 – 46. Indigenous herbs and their curative properties
- 47 – 48. Important herbal formulations

Learning outcome:

Unit	Vague out come	Most precious out come
1	Studying the importance and distillation methods for medicinal and aromatic plants	1. Understanding the importance of Medicinal plants and Aromatic plants 2. Understanding the distillation methods of essential oils of Medicinal plants and Aromatic plants
2	Studying the production technology of medicinal yam, senna, fox glove and sarpagandha	1. Understanding the production technology of medicinal yam, senna, fox glove and sarpagandha 2. Understanding the Economic parts of medicinal yam, senna, fox glove and sarpagandha
3	Studying the production technology of periwinkle, isubgol, belladonna and ipecac	1. Understanding the production technology of periwinkle, isubgol, belladonna and ipecac 2. Understanding the Economic parts of periwinkle, isubgol, belladonna and ipecac
4	Studying the production technology of lemon grass, palmarosa, citronella, vetiver, geranium and patchouli	1. Understanding the production technology of lemongrass, palmarosa, citronella, vetiver, geranium and patchouli 2. Understanding the distillation methods of essential oils of Aromatic plants.
5	Studying the Role of Indigenous herbs in disease control and Important herbal formulations	1. Understanding the Indigenous herbs in disease control. 2. Understanding the Important herbal formulations

