HOR H11 Basics in Horticulture 2+1

Theory

Horticulture – Definition, scope and importance, Division and classification of horticultural crops – Horticultural zones in India and Tamil Nadu - Propagation – definition, propagation methods, seed propagation, vegetative propagation, micro propagation – Planting systems – Protected cultivation – irrigation systems - Weed management – nutrient application methods in horticultural crops – crop regulation – physical and chemical regulation - Special practices – training – pruning, ringing, notching, disbudding and pinching – Maturity indices – harvesting methods, pre cooling – packaging - storage of horticultural crops.

Practical

Features of an orchard – Tools, implements and machineries used for horticultural operations – Preparation of pot mixture, potting and repotting – Identification of major horticultural crops and their varieties – planting systems - Commercial propagation methods – cutting, grafting, layering and budding – preparation and use of growth regulators - Plant propagation structures – training and pruning practices –weed management - fertilizer application including fertigation – pests and disease management.

Theory Schedule

1. Definition – Horticulture – scope and importance of horticultural crops.
2. Nutritive value of horticultural crops.
3. Division and classification of horticultural crops.
4. Horticultural zones of India and Tamil Nadu.
5. Definition – propagation, merits and demerits and propagation methods.
6. Seed propagation – merits and demerits.
7. Importance of seed treatments, sowing and seedling establishment.
8. Study of plant growth regulators for seed and vegetable propagation.
9. Vegetative propagation – merits and demerits.
10. Propagation through cuttings – merits and demerits.
11. Propagation through layering – merits and demerits.
12. Propagation through grafting – merits and demerits.
13. Propagation through budding – merits and demerits.
14. Propagation through specialized plant parts.
15. Micro propagation – merits and demerits.
16. Study of planting systems.
17. **Mid Semester Examination**.
18. Study of cropping systems – Intercropping, mixed cropping, cover cropping and multitier cropping systems in horticultural crops.
19. Protected cultivation – Principles and special structure used for propagation.
20. Mist chamber and their maintenance.
21. Poly house and their maintenance.
22. Shade net house and their maintenance.

23. Green house and their maintenance.
24. Irrigation methods and their management practices in horticultural crops.
25. Surface and sub surface irrigation and their management.
26. Drip irrigation – merits and demerits.
27. Sprinkler irrigation – merits and demerits.
28. Fertigation systems in horticultural crops.
29. Weed management practices in horticultural crops
30. Nutrient application practices in horticultural crops.
31. Training and pruning systems in horticultural crops.
32. Special horticultural practices.
33. Maturity indices for important horticulture crops.
34. Post harvest operation for important horticultural crops.

Practical Schedule

1. Lay out of orchard and their components
2. Horticultural tools and implements used for various operations
3. Preparation of pot mixture, potting and repotting
4. Identification of major horticultural crops and their varieties
5. Planting systems in horticultural crops
6. Practicing propagation methods- Cutting and layering
7. Practicing propagation method – Budding and grafting
8. Preparation and use of growth regulators
9. Plant propagation structures (Mist chamber, Shade net, Poly house etc.)
10. Training systems in horticultural crops
11. Pruning practices in horticultural crops
12. Irrigation management in horticultural crops
13. Fertilizer application including fertigation in horticultural crops
14. Weed management in horticultural crops
15. Pests management in horticultural crops
16. Disease management in horticultural crops
17. **Final practical examination**

References

- Kumar, N. 2011. Introduction to Horticulture, Oxford and IBH Publication, New Delhi

HOR H12 Plant Propagation practices 0+2

Practical

Propagation - tools and implements – propagation - media - containers - preparation of nursery beds - seed treatment - sowing - plug transplants / seedling production - potting, depotting and repotting of plants - plant propagating structures - mist chamber - shade net – uses - hardening and maintenance - - application of growth regulators - growth regulators for seed and vegetative propagation - methods of asexual propagation through cuttings, layering, grafting and budding - types of cuttings - types of layering - potting of layers and hardening – raising of rootstocks - grafting methods - separation of grafts - potting and maintenance of grafted plants - budding methods - maintenance of budded plants –- - nutrition and plant protection - visit to commercial nurseries and tissue culture units.

Practical schedule

1. Planning and layout of nursery
2. Tools and implements used in the nursery
3. Media and containers used for propagation
4. Seed propagation - Preparation of seed beds, seed treatment and sowing
5. Procurement of mother plants- importance- care and maintenance of stock plants for propagation
6. Potting, repotting, handling and maintenance of seedling and rootstocks
7. Propagation structures *viz*., Mist chamber and their maintenance
8. Propagation structures *viz*., Poly house, Shade net house and their maintenance
9. Preparation of growth regulators and standardization of formulations for seed and vegetative propagation.
10. Propagation through cuttings
11. Propagation through layering
12. Propagation through grafting
13. Separation of grafts and maintenance of grafted plants
14. Propagation through budding
15. Visit to commercial shade net house and study the cost of erection of net houses
16. Propagation through specialized plant parts
17. Micro propagation techniques for important horticultural crops
18. Visit to commercial tissue culture units
19. Hardening techniques for vegetatively propagated plants
20. Irrigation management for nursery plants
21. Nutrition management for nursery plants
22. Pest management for nursery plants
23. Disease management for nursery plants
24. Nursery practices for important fruit crops (Rootstocks raising, pre curing of scions etc)
25. Visit to fruit nursery
26. Propagation practices for major spice crops
27. Propagation practices for major plantation crops
28. Propagation practices for major ornamental crops
29. Propagation practices for major medicinal crops
30. Propagation practices for major aromatic crops
31. Visit to ornamental nursery
32. Nursery record and maintenance
33. Working out cost economics for nursery operations
34. Final practical examination

References

- Kumar, N. 2011. Introduction to Horticulture, Oxford and IBH Publication, New Delhi

AGR H11 Fundamentals of Agronomy 1+1

Theory

Agriculture – Definition – Scope of agriculture in India and Tamil Nadu - Agronomy – Definition - Agronomical classification of crops – their importance. Major crops of India and Tamil Nadu.Factors affecting Crop Production – Moisture, Aeration, Light, Temperature and Nutrients.Cropping systems – definitions, Principles; Principles and Practices of Agricultural Operations – Tillage and Tilth – Objectives and Types of Tillage – Primary tillage, Secondary Tillage and Intercultural Operations - Principles of Seeds and Sowing – Seed Treatment – Nursery – Transplanting – Plant population and crop geometry. After cultivation - Gap Filling and Thinning – Weed management and irrigation. Manures – Organic Manures – Green Manures. Fertilizers – Methods of application – Basal, Split and Foliar application. Harvesting, Threshing, Drying and Storage.

Meteorology – Agricultural Meteorology – Definition - Importance of Agricultural Meteorology for Crop Production – Weather Parameters and their role in Crop Production – Agro Climatic Zones of Tamil Nadu

Practical

Identification of Crops in low land, irrigated upland and dry lands. Acquiring skill and estimating the efficiency of tillage implements. Practicing the implements used for Primary, Secondary Tillage – Practicing the implements used in rice cultivation. Skill learning and practicing nursery bed preparation for low and irrigated uplands. Skill imparting practices in seed treatment – Use of Bio Fertilizers – Learning seed and seedling treatment, practicing sowing and transplanting, weeding and irrigation. Identification of organic manures and green manures – Inorganic fertilizers – Identification of fertilizers.Application of organic manures, green manures and inorganic fertilizers – Measurement of growth and yield components of major crops.

Visiting Agro-met observatory – Handling Rain Gauge and recording rainfall – Single Stevenson screen - Maximum, Minimum, Dry and Wet Bulb Thermometers – Wind vane and anemometer - Standard Week-wise, Month-wise and Season-wise mean calculation and interpretation.

Lecture schedule

1. Agriculture – Definition – Scope of agriculture in India and Tamil Nadu Branches of Agriculture – Agronomy – Art and Science of Crop Production
2. Agronomic Classification of Crops – Their Importance, Major crops of India and Tamil Nadu
3. Factors affecting Crop Production - Moisture, Aeration, Light, Temperature and Nutrients
4. Principles and practices of agricultural operations – Tillage and tilth, objectives and types of tillage
5. Primary and Secondary tillage – Intercultural Operations
6. Cropping systems – Principles – merits and demerits
7. Principles of seeds and sowing – seed treatment
8. Optimum plant population, crop geometry and factors affecting them
9. **Mid Semester Examinations**
10. Nursery – Transplanting – Gap filling and thinning
11. After cultivation, weed management and irrigation methods
12. Manures – Organic Manures, Green Manures, Fertilizers
13. Methods of fertilizer application – Basal, split, foliar application, herbigation

14. Harvesting, Threshing, Drying, Storage
15. Meteorology – Agricultural Meteorology - Importance of agricultural meteorology for crop production
16. Weather parameters and their role in crop production
17. Weather forecasting and forewarning of pest and diseases - Agro Climatic Zones of Tamil Nadu

Practical schedule

1. Identification of Crops in low land, irrigated uplands and drylands
2. Acquiring skill in the primary and secondary tillage implements
3. Practicing the use of special purpose implements (seed drill, rotary weeder)
4. Skill learning and practicing nursery bed preparation for irrigated crops
5. Land shaping and lay out of field for dryland and irrigated conditions
6. Acquiring skill in seed treatment with plant protection chemicals
7. Uses of bio-fertilizers – learning seed and seedling treatment and soil application
8. Practicing sowing and transplanting
9. Practicing manual weeding and earthing up
10. Practicing irrigation for irrigated crops
11. Practicing application of organic manures and green manures
12. Inorganic fertilizers – identification of fertilizers and practicing various method of application of fertilizers
13. Spray volume calculation and foliar application of fertilizers
14. Skill learning in harvesting, threshing, drying and storage
15. Visiting Agro met observatory – acquiring skill in recording observations
16. Computing mean of rainfall data; standard week-wise, month-wise and season-wise
17. **Final practical Examination**

References

- Yellamananda Reddy, T and G.H. Sankara Reddy. 2010. Principles of Agronomy, Kalayani Publishers, New Delhi

SAC H11 Soil and Fertility management for Horticultural crops (1+1)

Theory

Soil – definition – components – pedology –Edaphology. Physical properties of soil – Colour, Texture, structure, Bulk density, Particle density, Pore space; soil water, soil air, soil temperature and their significance in crop production. Soil chemical properties – Soil reaction, EC and CEC. Soil Organic Matter and its importance on soil properties – Essential nutrients for crop plants - Major, secondary and micro nutrients –Soils of Tamil Nadu. Manures and fertilizers –Types – Straight, Complex, Compound, Mixed, Fortified and chelated fertilizers and their reactions in soil. Techniques to enhance fertilizer use efficienty. Soil fertility – INM and IPNS – Problem soils – acid, saline and alkaline soils- their formation, reclamation and management

Practical

Soil sampling – Analysis of soil for pH and EC, Texture by feel method, Determination of soil moisture- Identification and application methods of manures, fertilizers and biofertilisers. Working out fertilizer requirement- Foliar application of fertilizers -Identification of nutrient deficiencies/disorders in crops - Preparation of enriched FYM& MN mixtures, - Visit to compost yard and local problem soil areas – Determination of irrigation water quality.

Lecture Schedule

1. Soil – definition – soil as a natural body – three dimensional – major components by volume – Pedology – Edaphology.
2. Soil physical properties and its significance in plant growth.
3. Soil water and its significance in plant growth.
4. Soil air and Soil temperature and itstheir significance in plant growth.
5. Soil pH, EC and CECand its significance in crop production
6. OM decomposition – influence of OM on soil properties – C : N ratio – clay – humus complex and their significance on soil properties and plant growth.
7. Essential nutrients for crop plants. Role of nutrients (Major and secondary) and their deficiency and toxicity symptoms in crop plants.
8. Role of nutrients (Micro) and their deficiency and toxicity symptoms in crop plants.
9. Mid semester exam
10. Major soils of Tamil Nadu.
11. Manures and their classification.
12. & 13. Types of fertilizers (straight, complex, compound, mixed, fortified and chelated) and their properties and nutrient content and reactions in soil.
14. Techniques to enhance fertilizer use efficiency
15. Soil fertility, integrated Nutrient Management (INM) and integrated plant Nutrient supply system(IPNS).
16. Soil physical problems and their management
17. Chemical problems and their management (Salt affected soils and acid soils).

Practical Schedule

1. Study of different soils
2. Skill learning in soil sampling
3. Determination of soil texture by feel method
4. Determination of Bulk density, Particle density, Pore space by cylinder method.
5. Determination of soil moisture by oven dry method and soil pH and EC.
6. Working out fertilizer requirement for crops and Skill learning in foliar supply of nutrients.
7. Identification of major and secondary nutrient deficiencies / disorders in crops.
8. Identification micronutrient deficiencies/ disorders in crops
9. Preparation of enriched FYM & MN mixtures
10. Visit to compost preparation unit
11. Visit to local problem soil areas
12. Determination of irrigation water quality – pH, EC, CO_3 and HCO_3
13. Determination of irrigation water quality – Cl and SO_4
14. Determination of irrigation water quality Ca and Mg
15. Determination of irrigation water quality – Na & K.
16. Interpretation of irrigation water quality using analytical data.
17. **Final practical examination**

References

- T. Biswas, M.S. Mukherjee 2001. A text book of Soil Science

FMP H11 Farm Machinery for Horticultural crops 1+1

Theory

Unit I – Farm Power

Power sources for horticulture, IC engines- working principles, two stroke and four stroke engines, different systems of an IC engine. Orchard tractors - types, Selection of tractors and cost of tractor powerTractor and implement selection for different horticultural operations.

Unit III – Plant protection, harvesting and orchard management machinery

Plant protection equipment for orchards - Harvesting tools and equipment- Harvesting machinery for vegetable and fruit crops, tuber crops, tree and plantation crops. Lawn management machinery – lawn mowers and machinery.

Practical

Study of different components of IC engine, four stroke petrol engine, two stroke petrol engine.Identification of components of MB plough, disc plough, seed planters, their working mechanisms. Operation of tractor and implements - operation and maintenance power tiller – Study of different inter-cultivation equipments – pruners-Sprayers and dusters – their operation, repairs and adjustment - Harvesteing tools and harvesters for horticultural crops – Field capacity and cost analysis.

Lecture Schedule

1. Farm power in India - human, animal, mechanical and electrical energy sources and their use inhorticulture
2. Two stroke and Four stroke engines, working principles, applications - types, power and efficiency
3. Different systems of IC engine – cooling, lubricating, fuel injection systems
4. Orchard tractors- types and utilities
5. Tillage, objectives, types - Field capacity and field efficiency.
6. Primary tillage, objectives, mould board, disc plough, chisel plough and subsoiler, components andfunctions, types, advantages and disadvantages.
7. Secondary tillage equipment – harrows, land forming equipment – rotavators.
8. Sowing methods - seed planters - components and functions.
9. **Mid semester examination.**
10. Vegetable transplanters, types, working principle, field and nursery requirements - nursery Equipmentfor seeding and nursery germination.
11. Implements for intercultural operations – cultivators, sweep, junior hoe, manual weeders and power operated weeders for orchards.
12. Sprayers and their functions, classification, manually operated sprayers, power sprayers - Dusters, types and uses.
13. Tools for horticultural crops – propagation tools, planters and harvesting tools and machinery – Powered garden tools for orchard management.
14. Harvesting machinery for vegetable, fruit crops and tuber crops – for tree and plantation crops.
15. Equipment for land development and soil conservation - dozers, levelers, bund former.
16. Cost of operation of farm machinery – problem solving. 17. Tractor and implement selection for different horticultural operations.

Practical Schedule

1. Study of working of two and four stroke petrol IC engine
2. Identification of components of MB plough and disc plough, measurement of plough size, different parts, horizontal and vertical suction
3. Identification of components of disc harrows, bund former, leveller and rotavator
4. Identification of components of seed planters - furrow opener, metering mechanism and calibration
5. Study of tractors – their operation and maintenance.
6. Learning to drive tractor
7. Learning to operate tractor with mounted implement
8. Identification of components of power tiller - their operation and maintenance
9. Study of different inter-cultivation equipments such as power weeders and manually operated garden weeders
10. Identification of components of plant protection equipment – power sprayers, knapsack sprayers, dusters – minor repairs and adjustment of sprayers
11. Identification of components of vegetable transplanters – allied machinery for raising vegetable nursery
12. Study of mowers – Registration and alignment of cutter bars – Rotary lawn mowers
13. Tools for horticultural crops – propagation tools,pruners, planters and harvesting tools and machinery
14. Turmeric, tapioca and potato harvesters. Study of hoists and tree management machinery
15. Study of land development and soil conservation machinery - dozers, levelers, bund former and trenchers
16. Problems on field capacity and cost of operation of farm machinery
17. **Final practical examination**

References

- Srivastava, A.C., 1990. Elements of farm machinery.Oxford IBH pub Co., New Delhi.

AMP H11 Basics in Livestock Management and Poultry Production 1+1

Theory

Prelusion- Significance of Livestock and Poultry in Indian economy- Various systems of livestock production- Livestock and Poultry census and its role on national Gross Domestic Product- Special and common nomenclatures used in Animal Husbandry practices.

Breeds-Classification-White and Black cattle breeds- Breed characteristics of Sindhi, Kangayam, Umblacherry, Jersey, Holstein Friesian, Murrah and Surti - Signs of estrus cycle- Artificial Insemination- Housing management selection of site-space requirement-calf and adult stock- Care and management of new born- heifer- milch cattle and work bullocks.

Clean milk production- Nutrition-Ration-Balanced ration-Desirable characteristics of ration-Classification of feeds and fodder- Concentrate and Roughage's- - Composition and Requirement of ration for young and adult stock -Green fodder requirement and importance.

Diseases- Classification-Viral- Rinderpest-Foot and Mouth-Bacterial-Anthrax-Haemorrhagic septicemia-Black Quarters-Metabolic-Milk fever-Ketosis-Tympanites- causative organism - Transmission- Symptoms- Control and Prevention.

Farm Records- Record keeping- Insurance- Selection and culling of livestock.

Sheep and **Goat** farming- Classification of breeds-Exotic and indigenous- Nomenclature-Economic traits- Systems of rearing- Housing management - Care and management of young and adult stock- Nutrition- Common diseases-Sheep pox-Foot and Mouth-Blue Tongue-Enterotoxaemia-Ecto and endo parasites- Prevention and Control.

Poultry farming- Classification of breeds- Commercial strains of layer and broiler- Housing management-Brooding management-Deep litter-Cage system-Nutrition of Chick- Grower and Layer and Broiler- Diseases-Classification –Viral-Ranikhet-Infectious Bursal Disease-Bacterial-E.Coli-Coryza- Salmonellosis - Protozoan- Coccidiosis- Causative organisms-Symptoms-Vaccination-Disease control and Prevention.

Practical

Study of external parts of Livestock and Poultry-Identification of livestock and poultry-Tattooing-ear tags-wing and leg bands-Common restraining methods-Disbudding (or) Dehorning-Different methods of castration- Dentition-Study of type design of animal and poultry houses-Selection of dairy cow and work bullock-Determination of specific gravity, fat percentage and total solids of milk-Preservatives of milk-Identification of feeds and fodder-Economics Dairy,Goat and Swine farming's-Composition of livestock and poultry rations. Brooder management-Judging of a layer from non layer-Debeaking, delousing and deworming of poultry-Vaccination schedule for broiler and layer-Economics of poultry production .– Visit to a modern Dairy plant and commercial layer and broiler farms.

Lecture Schedule

1. Prelusion-Significance of livestock and poultry in Indian economy.
2. Definition of breed-classification of indigenous and exotic white and black Cattle-Breed characteristicsof Sindhi, Kangayam and Umblacherry, Jersey and Holstein Friesian.
3. Various systems of livestock production-extensive – semi intensive, intensive. Breeding- estrous cycle- Artificial insemination-merits and demerits.
4. Type design of house-systems of housing.
5. Care and management of new born calf, heifers and pregnant animal and lactating animals

6. Milk-Definition- Clean milk production
7. Nutrition-Definition-Ration-Balanced ration-Desirable characteristics of a ration. Classification of feedstuffs-Concentrate and roughage- Importance of green fodder.
8. Diseases- Classification-Viral- Rinderpest-Foot and Mouth-Bacterial-Anthrax-Haemorrhagic septicemia-Black Quarters-Metabolic-Milk fever-Ketosis-Tympanites- causative organism – Transmission- Symptoms- Control and Prevention.
9. **Mid semester Examination**
10. Sheep and Goat farming-classification of breeds of Indian and exotic origin- nomenclature alone.
11. Rearing Methods-Housing- Type design of houses-Floor space requirement
12. Care and management of sheep and goat- Ram-Ewe-Kids-Buck-Doe and kids
13. Nutrition- Feeds and Fodder for small ruminants. Common diseases-Sheep pox-Foot and Mouth-Blue Tongue-Enterotoxaemia-Ecto and endo parasites- Prevention and Control.
14. Nomenclature of commercial strains of layer ands broiler-brooder management.
15. Systems of housing- Deep litter and Cage system- Floor space requirement- Common litter material-litter management-merits and demerits. Care and management of layers and broilers - vaccination schedule.
16. Nutrition-Feed formulation-composition of chick, grower, layer broiler starter and finisher mashes-Feed Conversion Ratio /dozen egg or kg of meat production
17. Diseases-Classification –Viral-Ranikhet-Infectious Bursal Disease-Bacterial-E.Coli-Coryza-Salmonellosis - Protozoan- Coccidiosis- Causative organisms-Symptoms-Vaccination-Disease control and Prevention.

Practical Schedule

1. Study of external parts of Livestock.
2. Identification of livestock and poultry a) Tattooing b) Ear tags c) Wing band and) Leg band.
3. Common restraining methods of livestock
4. Disbudding , Dehorning , Castration and Dentition of livestock.
5. Study of type design of animal and poultry houses and Judging.
6. Selection of Dairy cattle. Score card evaluation
7. Selection of work work bullock. Score card evaluation
8. Determination of Specific gravity, Fat percentage ,Total solids, Solids not fat.
9. Identification of Common feed and fodder for livestock.
10. Model composition of concentrate mixture for livestock.
11. Study of external parts of fowl. Preparation of brooder house.
12. Identification of layer and non layer.
13. Demonstration of debeaking , delousing , deworming and vaccination in poultry.
14. Nutrition-Feed formulation-composition of chick, grower, layer broiler starter and finisher mashes-Feed Conversion Ratio /dozen egg or kg of meat production.
15. Demonstration of dressing broiler
16. Visit to a modern dairy plant and commercial layer and broiler farm.
17. **Practical examination.**

References

- *Banerjee*, G.C. 1993 The Text Book of Animal Husbandry Oxford Book Company, Calcutta.
- Dairy India Year Book 5th edition. A-25, Priyadarshini Vihar, Delhi.
- *ICAR, 1997* A Hand Book of Animal Husbandry.

PED X11 Physical Education 0+1

Practical schedule

Seventeen practical classes of 2½ hours each will be converted into 40 practical hours and 2½ hours for evaluation.

I Semester (20 Hours) (First year)

Posture Exercises for good posture, Exercises for improving strength, agility, co-ordination, flexibility, endurance and speed. Conditioning and callisthenic exercises, skill development in anyone of the Games, Badminton, Ball Badminton, Basket Ball, Chess, Cricket, Football, Handball, Hockey, Kabaddi, Kho-Kho, Table Tennis and Volley Ball. Skill development in athletic activities before start, loosening up, standing, sitting and relaxation. Meditation, Asanas for memory and concentration.

II Semester (20 Hours + 2½ Hours) (First year)

Skill Development in anyone of the major Games, Indoor Games and Athletics.Exercises to improve posture, meditation, Pranayama and Breathing techniques.Asanas : Padmasana, Bhujankasana, Trikonasana, Suryanamaskar, Vajrasana, Dhanurasana. Exercises for Back pain, stress, Hypertension, obesity, eye problems, Head Ache and Abdominal problems. Lead up Games Participating in various tournaments and coaching camps Leisure time games Teaching health and Safety Education, Developing leadership qualities by organizing class matches, Intramurals and friendly matches. Marks will be awarded at the end of the Second Semester based on the above method of procedure. Final Class Grade Chart will be sent to the Principal / Head of the concerned institutes.

LAN X 11 English Languages for Effective Communication 0+1

Aim

To make the students competent in day–to-day English language skills viz.,

- Listening to comprehend for information.
- Speaking with clarity and confidence.
- Reading for information.
- Writing with ease.

Unit I - LISTENING

Introduction to Listening - listening vs. hearing – kinds of listening – Active listening - listening comprehension – note taking.

Unit II - SPEAKING

Introduction to Speaking – Dialogue and Conversation – Principles of speech preparation– self introduction – short speech - welcome address – vote-of-thanks –telephonic conversation.

Unit III - READING

Introduction to reading - types of reading - skimming and scanning - idea reading (reading for information) – note-making – précis writing.

Unit IV - WRITING

Introduction to basic sentence structure - sentence completion – sentence correction - dialogue writing – paragraph writing – essay writing – letter writing.

Unit V - INTEGRATED SKILLS:

Presentation skills - Group Discussion –Resume writing.

The Practical Class Schedule for the revised English course is as follows:

1. Introduction to listening - listening vs. hearing - kinds of listening.
2. Active listening – listening comprehension – note taking.
3. Introduction to speaking - Dialogue and Conversation- Principles of speech preparation.
4. Presentation skills - self introduction - short speech.
5. Welcome address - vote-of-thanks – telephonic conversation.
6. Introduction to reading - types of reading - skimming and scanning - idea reading (reading for information).
7. Note-making – précis writing.
8. Introduction to basic sentence structures.
9. **Mid semester Examination.**
10. Sentence completion – Sentence correction.
11. Dialogue writing – paragraph writing.
12. Essay writing.
13. Letter writing – kinds of letter writing – writing letter to the editor.
14. Presentation skills
15. Group Discussion.
16. Resume writing.
17. **Final Practical Examination**

Text Books :

1. Hariharan,S. et al., *English for Effective Communication*. Coimbatore, Thannambikkai publications, 2014. Third edition.

HOR H13 Fruit crops Production Technology 1+2

Theory

Definition – area and production of fruit crops in Tamil Nadu – Orchard management – Definition- Selection and layout of orchard - Physical features in orchard.

Study of cultural practices of the following fruit crops, with reference to soil, climate, varieties, methods of propagation, nutrient, irrigation and weed management practices – training and pruning – role of growth regulators – maturity standards for harvesting – post harvest technology of fruit crops – yield – grading – packing – storage and value added products. Tropical fruits – Mango, Banana, Grapes, Papaya, Sapota, Guava, Jack.Sub-tropical and temperate fruits – Pineapple, Avocado, Apple, Pear - Organic fruit production and Good Agricultural Practices.

Practical

Layout of orchards – methods of planting – manuring and irrigation methods – training and pruning of different fruit crops – judging maturity standards of major fruit crops – pest and disease management in fruit crops. Visit to commercial orchards – fruit processing unit. Orchard planning and budgeting – Calendar of operation for important fruit crops.Working out cost of cultivation for important fruit crops - Maintenance of orchard accounts and records. Crops: Tropical fruits – Mango, Banana, Grapes, Papaya, Sapota, Guava, Acid Lime, apple, Avocado, Apple and Pear.

Lecture Schedule

1. Definition – Area & production of fruits in Tamil Nadu.
2. Orchard management – Definition, objectives, scope and importance, physical features in orchard
3. Study of varieties and propagation methods of Mango
4. Study of cultural practices of mango
5. Study of varieties and planting systems of banana
6. Study of cultural practices of banana
7. Study of cultural practices of grapes.
8. Study of cultural practices of papaya.
9. Mid semester Examination
10. Study of cultural practices of Sapota
11. Study of cultural practices of Guava
12 Study of cultural practices of Acidlime, Mandarin
13. Study of cultural practices of Pineapple.
14. Study of cultural practices of Avocado, Jack.
15. Study of cultural practices of Apple and Pear.
16. Introduction to Organic fruit production
17. Good Agricultural Practices in fruit crops

Practical schedule

1. Selection and layout of orchards and physical features in orchard.
2. Different planting systems in fruit crops
3. Practices in mango propagation
4. Practicing pruning in mango
5. Practicing Top working and rejuvenation of senile mango orchards
6. Visit to HDP fruit orchards

7. Practicing sucker treatment for banana and planting
8. Practicing bunch cover application and other special operations followed in banana
9. Practices in grapes propagation
10. Practicing training in grapes
11. Practicing pruning in grapes
12. Nursery practices for papaya
13. Practicing papain extraction from Papaya
14. Practices in sapota propagation
15. Practices in guava propagation
16. Nursery practices for Acid lime
17. Nursery practices for jack
18. Growth regulator application in fruit crops
19. Visit to sub tropical fruits cultivating areas and identifying their important varieties
20. Irrigation management in fruit crops
21. Irrigation systems and their maintenance
22. Practicing micro nutrient spray in fruit crops
23. Practicing integrated nutrient management in fruit crops and their corrective measures
24. Weed management in fruit crops
25.Identification of nutrient deficiency symptoms in major fruit trees
26. Machineries for fruit cultivation
27. Identification of important pest symptoms and their corrective measures
28.Identification of important disease symptoms and their corrective measures
29. Preparing calendar of operations for different fruit crops
30. Visit to temperate fruit orchards
31. Visit to fruit processing industries
32. Farm planning and budgeting
33. Working out cost economics of cultivation of fruit crops
34. Final practical Examination

References

- Veeraraghavathatham, D., M. Jawaharlal, S. Jeeva and S. Rabindran 2004. Scientific Fruit culture, Suri Associates, Coimbatore.

HOR H14 Dry Land Horticulture 1+1

Theory

Dry land horticulture – Importance, scope and distribution of arid and semi arid zones in India and Tamil Nadu. Crops suitable for dry land systems – Important varieties, climate and soil requirements, commercial propagation methods - Spacing and planting patterns - Cropping systems and intercropping – mulching - Soil and moisture conservation methods – Anti transpirants – Management of nutrients, water, weeds and problem soils – Regulation of cropping – training and pruning methods - top working and rejuvenation – Use of plant growth regulators – Post harvest handling – Economics of production.

Crops: Aonla, Ber, Pomegranate, Custard Apple, Jamun, Bael, Wood Apple, Manila Tamarind. Cluster beans, Senna, Periwinkle, Vetiver and Palmarosa

Practical

Description and identification of cultivars/varieties - nursery management - nursery preparation, seed sowing and raising seedlings / rootstocks, practicing propagation techniques of dry land horticultural crops. soil and moisture conservation practices - Practicing water harvesting methods – practices in nutrient management, crop regulation – harvesting and post harvest practices - grading and packaging - visit to commercial dry land fruit orchards Crops: Aonla, Ber, Pomegranate, Custard Apple, Jamun, Bael, Wood Apple, Manila Tamarind. Cluster beans, Senna, Periwinkle, Vetiver and Palmarosa.

Lecture Schedule

1. Dry land Horticulture - overview: Area, production, and export potential, past and present status of dry land fruits in India and Tamil Nadu
2. General appraisal of dry land horticulture regions / zones in India and Tamil Nadu – special features of arid and semi arid zone fruits.
3. Cropping systems and intercropping – crops suitable for dry land system – spacing and planting patterns for dry land horticultural crops
4. Soil and moisture conservation methods and management of problem soils
5. Aonla - climate and soil requirements – varieties - production constraints – propagation – planting method –planting density – pollination - nutrient, weed and water management - raining and pruning - use of growth regulators – harvest - grading – postharvest handling.
6. Ber - climate and soil requirements – varieties– production constraints, propagation – planting density – nutrient, weed and water management - training and pruning - use of growth regulators - and harvest – grading – postharvest handling.
7. Pomegranate - climate and soil requirements – varieties – propagation – planting density – nutrient, weed and water management, training and pruning-Growth regulation by chemical regulators and harvest - grading – postharvest handling.
8. Custard apple - climate and soil requirements – varieties – propagation – planting density – nutrient, weed and water management - training and pruning – crop regulation - use of growth regulators – harvest - grading – postharvest handling & processing
9. **Mid semester examination**
10. Jamun - climate and soil requirements - varieties - propagation - planting density - nutrient, weed and water management - use of growth regulators - harvest - grading – postharvest handling

11. Bael - climate and soil requirements - production constraints - propagation - planting density - nutrient, weed and water management - harvest - grading - postharvest handling
12. Wood apple - climate and soil requirements – varieties – propagation – planting density – nutrient, weed and water management– use of growth regulators – harvest - grading – postharvest handling
13. Manila tamarind - climate and soil requirements – varieties – propagation – planting density – nutrient, weed and water management— harvest - grading – postharvest handling
14. Cluster beans - climate and soil requirements – varieties – propagation – Spacing – nutrient, weed and water management– use of growth regulators – harvest - grading – postharvest handling
15. Senna, Periwinkle - climate and soil requirements – varieties – propagation – Spacing – nutrient, weed and water management – use of growth regulators – harvest - grading – postharvest handling
16. Vetiver and Palmarosa- climate and soil requirements – varieties – propagation – planting density – nutrient, weed and water management– use of growth regulators – harvest - grading – postharvest handling.

Practical

1. Study of soil conservation practices for dry land horticulture
2. Study of moisture conservation practices for dry land horticulture
3. Study of water and nutrient management strategies for dry land horticulture
4. Study of Aonla varieties, crop regulation and Propagation methods
5. Study of Ber varieties, Propagation methods
6. Study of Pomegranate varieties, Propagation methods
7. Crop regulation and post harvest technology of Pomegranate
8. Study of Custard apple varieties, Propagation methods
9. Propagation and Crop regulation of Custard apple
10. Study of Jamun varieties, propagation and planting
11. Study of Bael and Wood apple varieties, propagation and planting
12. Study of Manila tamarind varieties, propagation and planting
13. Study of Cluster bean varieties, propagation and cultural practices
14. Study of Senna varieties, propagation and cultural practices
15. Study of Periwinkle varieties, propagation and cultural practices
16. Study of Vetiver and Palmarosa varieties, propagation and cultural practices
17. **Practical examination.**

References

- Chadha, K.L. 2001. Handbook of Horticulture. ICAR, Delhi
- Veeraraghavathatham, D., M. Jawaharlal, S. Jeeva and S. Rabindran 2004. Scientific Fruit culture, Suri Associates, Coimbatore.

HOR H15 Basics of Ornamental gardening and Landscaping 1+1

Theory

Scope and importance of ornamental gardening and landscaping –principles – formal and informal garden – Styles of garden - Features of garden - Garden components and adornments – plant Components - edges, hedges, flower beds, trophy, topiary, mixed borders - non plant components - garden walls, fencing, steps, garden drives and paths, pavements, fountains, arches, pergolas, trellises, pools, etc.

Operations in maintenance of trees, annuals, shrubs, climbers, creepers, herbaceous perennials, ferns, cacti and succulents, palms and cycads – sunken garden, roof garden, rockeries.

Operations in planting and maintenance of public garden, institutional garden, Industrial garden, residential complex garden - Operations in landscape maintenance for high ways, bus terminus, airports, city roads and IT parks.

Lawn – types of lawn grasses – criteria for selection- methods of lawn establishment - operation and maintenance – problems and remedial management – flower arrangements and dry flowers – suitable plant spp. and methods.

Practical

Features of ornamental garden, Identification of ornamental plant species – identification of plant and non plant components – practices in establishment and maintenance of plant and non plant components – identification of lawn grasses – practices in lawn making methods – operations in ornamental nursery - exposure visit to, industrial, institutional, residential complex, public garden – project preparation.

Theory Schedule

1. Scope and importance of ornamental gardening and landscaping
2. principles of ornamental gardening
3. Formal and informal types of garden
4. Styles and features of gardens
5. Garden components and adornments
6. Plant components: edges, hedges, flower beds, trophy, topiary, mixed borders etc.,
7. Non plant components - garden walls, fencing, steps, garden drives and paths, pavements, fountains, arches, pergolas, trellises, pools, etc.
8. Operations in maintenance of annuals and herbaceous perennials.
9. Operations in establishment and maintenance of trees and shrubs,
10. Operations in establishment and maintenance of creepers, climbers, ferns, cacti and succulents
11. Operations in establishment and maintenance of palms and cycads
12. Establishment and maintenance of sunken garden, roof garden and rockeries.
13. Operations in planting and maintenance of public garden, institutional garden
14. Operations in planting and maintenance of Industrial garden, residential complex garden
15. Operations in landscape maintenance for high ways, bus terminus, airports, city roads and IT parks

16. Lawn – types of lawn grasses – criteria for selection- methods of lawn establishment – operation and maintenance – problems and remedial management
17. Flower arrangements and dry flowers: suitable plant spp. and methods.

Practical schedule

1. Study of different plant components in ornamental garden
2. Identification of ornamental plant species – Trees
3. Identification of ornamental plant species – Annuals
4. Identification of ornamental plant species – Shrubs
5. Identification of ornamental plant species – Climbers and creepers
6. Identification of ornamental plant species – Ferns, cacti and succulents
7. Identification of ornamental plant species – Palms and cycades.
8. Practices in establishment and maintenance of non plant components
9. Practices in establishment and maintenance of plant components
10. Practices in establishment and maintenance of non plant components
11. Identification of lawn grasses
12. Practices in lawn making methods
13. Practices in nursery production of ornamental plants
14. Exposure visit to industrial garden and institutional garden
15. Exposure visit to residential complex and public garden
16. Project preparation on different types of garden
17. Final practical examination

References

- Randhawa, G.S and Mukhopadhyay, A. 1998. Floriculture in India. Allied Publishers Pvt.Ltd., New Delhi.
- Aroara, J.S 2010, Introductory Ornamental Horticulture. Kalyoni publishers, New Delhi, India
- Kumar, N. 2011. Introduction to Horticulture, Oxford and IBH Publication, New Delhi

HOR H16 Medicinal and Aromatic crops production Technology 1+1

Theory

Medicinal and aromatic plants - Definitions, Scope and importance.Medicinal plant wealth of India and Tamil Nadu - area and production - classification - annual, biennial and herbaceous perennial.Medicinal and aromatic plants for tropical, sub – tropical and temperate region. Soil and climatic - conditions, propagation and planting, manuring, irrigation, weed control, harvesting, yield, economic parts, post harvest handling, curing and processing practices, storage methods - contract farming and Good Agricultural Practices.

Medicinal Plants:

Glory lily, Medicinal Coleus, Senna, Periwinkle, Gymnema, Ashwagandha, Phyllanthus, Kalmegh, *Aloe vera* and Stevia.

Aromatic Plants:

Japanese mint,Rosemary,Lemon grass, Citronella, Palmarosa, Vetiver, Geranium, Patchouli, Sacred and sweet basil.

Practical

Identification and description of medicinal plants, parts used - nursery raising and planting – intercultural operations-harvest-processing-post harvest handling-cost of cultivation.

Medicinal Plants:

Glory lily, Medicinal Coleus, Senna, Periwinkle, Ashwagandha, Gymnema, Phyllanthus, Kalmegh, Aloe vera and Stevia Identification and description of aromatic plants, parts used - nursery raising and planting –intercultural operations-harvest- post harvest handling and extraction of essential oil- cost of cultivation.

Aromatic Plants:

Japanese mint, Rosemary, Lemon grass, Citronella, Palmarosa, Vetiver, Geranium, Patchouli, Sacred and sweet basil.

Lecture schedule

1. Scope and importance of medicinal plants-Classification of medicinal plants-annual, biennial and herbaceous perennial-Medicinal plants for tropical, sub - tropical and temperate regions
2. Production technology of Gloriosa and coleus
3. Production technology of Senna and Periwinkle
4. Production technology of Ashwagandha and Gymnema
5. Production technology of Phyllanthus and Kalmegh,
6. Production technology of Aloe vera and Stevia
7. Contract farming in medicinal plants

8. Good Agricultural Practices for medicinal plants
9. Mid semester Examination
10. Post harvest handling and processing methods
11. Scope, importance of aromatic plants and classification of aromatic plants
12. Production technology of Japanese mint and Rosemary
13. Production technology of Lemon grass and Citronella
14. Production technology of Palmarosa, Vetiver
15. Production technology of Geranium, Patchouli
16. Production technology of Sacred and sweet basil
17. Processing and extraction technologies for aromatic crops

Practical Schedule

1. Identification and description of Medicinal plants and parts used
2. Field preparation-propagation-selection of tuber-tuber treatment –intercultural operations-harvest indices-harvesting-processing-post harvest handling of Glory lily
3. Propagation-planting methods- intercultural operations-harvest indices-harvesting-cost of cultivation-processing-post harvest handling of coleus
4. Propagation-planting-seed treatment- intercultural operations –harvest- cost of cultivation - post harvest handling of Ashwagandha and senna
5. Propagation-nursery raising-planting- intercultural operations –harvest- cost of cultivation - post harvest handling of Periwinkle, phyllanthus and kalmegh
6. Propagation-selection of planting material -planting- intercultural operations –harvest- cost of cultivation -post harvest handling of Aloe
7. Propagation-selection of planting material -planting- intercultural operations –harvest- cost of cultivation -post harvest handling of Stevia
8. Propagation-selection of planting material -planting- intercultural operations –harvest- cost of cultivation -post harvest handling of Gymnema
9. Identification of aromatic plants –parts used
10. Field preparation –propagation-selection of planting material-intercultural operation-harvest indices-harvesting -post harvest handling-cost of cultivation for palmarosa and lemon grass
11. Field preparation –propagation-selection of planting material-intercultural operation-harvest indices-harvesting -post harvest handling-cost of cultivation for citronella and vetiver
12. Propagation-selection of planting material-intercultural operation-harvest indices-harvesting post harvest handling-cost of cultivation for Japanese mint and Rosemary
13. Propagation-selection of planting material-intercultural operation-harvest indices-harvesting post harvest handling-cost of cultivation for Geranium and Patchouli
14. Propagation-selection of planting material-intercultural operation-harvest indices-harvesting post harvest handling-cost of cultivation for Sacred and sweet basil
15. Extraction of essential oils from aromatic plants and visit to aromatic industry
16. Visit to medicinal plant processing unit
17. Final practical Examination.

References

- A.A.Farooqi and B.S. Sreeramu.2004.Cultivation of medicinal and aromatic crops.University press

HOR H17 Study Tour – I (0+1)

Visit to places of commercial cultivation of fruits and vegetables in tropical temperate an sub-tropical zones of Tamil Nadu – study of cropping systems- varieties – constraints in production – marketing – economic analysis – case studies.

Practical schedule

1. Visit to SHF, Courtalam for sub-tropical fruits.
2. Visit to AC&RI, Killikulam for tropical fruits and vegetables.
3. Visit to RRS, Aruppukottai and AC&RI, Madurai for arid zone fruits.
4. Visit to HC&RI, Periyakulam and Cumbum valley
5. Visit to HC&RIW, Trichy, NRC-Banana,
6. Visit to Sugarcane Research Station, Sirugamani for Betelvine

FOR H11 Agroforestry and Silvihorticulture 0+1

Practical

Silvics, silviculture and Agroforestry – Classification of agroforestry system and its merits and demerits - Study about structure and components of silvihorticultural system-Study of compatible tree species for silvihorticultural system - Conducting Design and Diagnosis exercise - Visit to successful silvihorti models - Assessing the shade effect and light intensity of trees on phenology of horticultural intercrops - Study on the below and above ground interaction and allelopathic effect of trees on horticultural crops - Assessing the productivity of horticulture crops under silvihorticultural system- Economics of silvihorticultural system. - Identification of fruit trees for silvihorticultural system - Important multipurpose fruit trees suitable for silvihorticultural system - Management practices for improved fruit crop production under silvihorticultural system – Soil fertility management of fruit trees for enhancing the productivity in silvihorticultural system – Potential vegetables , spices, plantation crops , flower crops, medicinal and aromatic plants under silvihorticultural system.

Practical schedule

1. Silvics, silviculture and Agroforestry.
2. Classification of agroforestry system and its merits and demerits.
3. Study about structure and components of silvihorticultural system-Study of compatible tree species for silvihorticultural system.
4. Conducting silvihorticulture Design and Diagnosis exercise.
5. Visit to successful silvihorti models.
6. Assessing the shade effect and light intensity of trees on phenology of horticultural intercrops.
7. Study on the below and above ground interaction and allelopathic effect of trees on horticulture crops.
8. Assessing the productivity of horticulture crops under silvihorticultural system.
9. **Mid semester examination**
10. Economic analysis of Silvihorticultural system.
11. Identification of fruit trees for silvihorticultural system and study of important multipurpose fruit trees suitable for silvihorticultural system.
12. Study on the management practices for improved fruit crop production under silvihorticultural system.
13. Soil fertility management of fruit trees for enhancing the productivity in silvihorticultural system.
14. Potential vegetables and flower crops under silvihorticultural system.
15. Potential spices and plantation crops under silvihorticultural system.
16. Potential medicinal and aromatic plants under silvihorticultural system
17. **Practical examination**

References

- Chundawat, S. 1995. A text book of agro forestry and IBH publishing Co. Pvt. Ltd., 66 Janpath , New Delhi.

AGR H12 Irrigation and Weed management in Horticultural crops 1+1

Theory

Irrigation – sources of water for irrigation – water movement, soil–plant - atmosphere Continuam soil moisture constants – available soil moisture - effect of water stress on crop yield – water useefficiency – water requirement of major crops – critical stages of water requirement – irrigationscheduling – types and advantages – Irrigation methods – Irrigation water use efficiency – management of poor quality irrigation water. Weeds – definition and importance of weed control in crop production – classification of weeds – methods of weed control – manual, mechanical, cultural, chemical and biological methods relative merits and demerits – Herbicide classification based on method of application – weed control practices for major horticultural crops – parasitic, problematic, aquatic and waste land weed management - integrated weed management – concepts and practices.

Practical

Measurement of irrigation water – field preparation for increased irrigation efficiency methods ofirrigation – planning and layout – drip, sprinkler and surge irrigations – calculation of water requirement of important crops. Soil and water conservation practices. Identification and study of weeds – practicing different methods of weed control – identifications of herbicides – study of sprayers for herbicide application – methods of herbicide application – spray volume calculation – Practicing control of parasitic, problematic and aquatic weeds.

Lecture schedule

1. Irrigation – definition – sources of water, area under irrigation in Tamil Nadu
2. Water movement – Soil–plant–atmosphere continuam and importance of water for crop cultivation
3. Soil moisture constants – available soil moisture – field capacity - permanent wilting point and effect of soil moisture stress on crop yield
4. Water requirement of major crops – water use efficiency – critical stages of water requirements
5. Irrigation scheduling – types and their advantages
6. Methods of irrigation – check basin, furrow methods, border strip, ring basins, drip, sprinkler, surge and rain guns
7. Crop water use efficiency under various irrigation methods
8. Management of poor quality irrigation water
9. **Mid semester examinations**
10. Weeds - definition – scope and importance of weed management in crop production
11. Classification of weeds
12. Methods of weed control – manual, mechanical, cultural, chemical and biological methods – advantages and disadvantages
13. Classification of herbicides based on method of application
14. Weed management for major horticultural crops
15. Management of parasitic, problematic, aquatic and waste land weeds
16. Integrated weed management – concepts and practices
17. Economics of weed control – weed control efficiency

Practical schedule

1. Measurement of irrigation water
2. Field preparation and layout of surface irrigation methods
3. Planning and layout of drip, sprinkler irrigation methods
4. Study of irrigation methods for different crops
5. Irrigation scheduling for important crops
6. Calculation of water requirements of important crops
7. Study of land configuration for soil and water conservation practices
8. Working out crop water use efficiency for various irrigation methods
9. Mid semester examination
10. Classification and identification of weeds
11. Practicing manual methods of weed control
12. Practicing mechanical methods of weed control
13. Study of sprayers and spray volume calculation for herbicide application
14. Identification of herbicides - practicing herbicides application techniques
15. Practicing parasitic and aquatic weed control
16. Practicing management of perennial (*Cyanodon*) and problematic (*Parthinium*) weeds
17. **Final practical examination**

References

- Yellamanda Reddy, T and G.H.. Sankara Reddy. 2010. Principle of Agronomy, Kalyani Publishers, New Delhi.

AEN H11 Basics in Plant protection 0 + 1

Practical

Insect pest - Definition – Characters of an insect. Basic knowledge about insect groups – adaptations. Field diagnosis of insect pest damage - assessment – surveillance. Different types of pest management strategies – Natural enemies - Production of predators and parasitoids. Insecticides – Groups – Use – Application methods. Integrated pest management – ETL and EIL. Productive insects - Culturing of mulberry silkworm – Honey bees – role - methods of beekeeping. Plant parasitic nematodes – Field diagnosis and identification of crop diseases. Identification and monitoring of fungal, bacterial, phytoplasma and viral diseases – Management of crop diseases – Biological and chemical methods – Mass production of Trichoderma and Pseudomonas. Group of fungicides and bactericides – Preparation and application.

Practical schedule

1. Structure of grass hopper- a typical insect pest
2. Structural, anatomical and behavioral adaptations of different groups of insect pests.
3. Insect pest damage- Identification assessment and surveillance.
4. Identification and mass multiplication of predators and parasitoids.
5. Groups of insecticides, their use and methods of application.
6. Study of various pest management methods.
7. Methods of culturing mulberry silkworm.
8. Identification of honey bees and methods of bee keeping.
9. **Mid semester examination.**
10. Identification of damage caused by plant parasitic nematodes.
11. Identification of fungal and bacterial crop diseases.
12. Identification of phytoplasma and viral crop diseases.
13. Methods of monitoring crop diseases.
14. Identification of different groups of fungicides, bactericides their preparation and use.
15. Spray fluid preparation and methods of application.
16. Production of bio control agents
    (Trichoderma and Pseudomonas) and their use.
17. **Final examination.**

References

- Prakasam, V., T. Raguchander, and K. Prabakar, 1998. Plant Disease Management, A.E. Publication, Coimbatore.

HOR H18 Vegetable crops Production Technology 1+2

Theory

Scope and importance of vegetable cultivation – area and production in Tamilnadu – systems of vegetable cultivation – kitchen garden – truck garden and market garden – gardening for rocessing. Climate – soil requirement –varieties / hybrids – seed rate – nursery practices – protray nursery – transplanting – manuring – irrigation –fertigation. Weeding –chemical –mechanical weed control – use of growth regulators- special horticultural practices(training,staking, pruning) – physiological disorders, nutrient deficiency and their corrective measures– Maturity indices- harvesting – grading, sorting – packing and storage and yield . Tomato, Brinjal, Chillies, Bhendi, Onion, Gourds- bitter gourds – Ridge gourds –Snake gourds - pumpkin - Water melon – Musk melon - Ash gourd -Tapioca – Yams – Colocasia - Cabbage – Cauliflower, Radish – Carrot Beet root, Amaranthus – Moringa – Potato – Cluster beans – Lab lab - Peas and Beans.

Practical

Identification and description of vegetable varieties – preparation of nursery bed, protray nursery and transplanting – preparation of main field –ridges and furrows- formation of beds, methods of manuring –irrigation systems –flood irrigation, furrow irrigation and fertigation – practices in hand and chemical weeding- Maturity indices– harvesting – grading, sorting – packing and cold storage - Working out cost of cultivation – visit to storage units, poly house units and net houses.

Lecture schedule

1. Scope and importance of vegetable – area and production in Tamilnadu.
2. Systems of vegetable cultivation – kitchen garden –truck garden and market garden – gardening for processing.
3. Climate – soil requirement –varieties / hybrids – seed rate – nursery practices – protray nursery – transplanting – manuring – irrigation –fertigation. Weeding –chemical – mechanical weed control – use of growth regulators- special horticultural practices(training, staking, pruning) – physiological disorders, nutrient deficiency and their corrective measures– maturity indices- harvesting – grading, sorting – packing storage and yield of Tomato.
4. Climate – soil requirement –varieties / hybrids – seed rate – nursery practices – protray nursery – transplanting – manuring – irrigation –fertigation. Weeding –chemical –mechanical weed control – use of growth regulators-special horticultural practices- nutrient deficiency and their corrective measures– maturity indices- harvesting – grading, sorting – packing – storage and yield of Brinjal.
5. Climate – soil requirement –varieties / hybrids – seed rate – nursery practices – protray nursery – transplanting – manuring – irrigation –fertigation. Weeding –chemical – mechanical weed control – use of growth regulators special horticultural practices- nutrient deficiency and their corrective measures maturity indices- harvesting – grading, sorting – packing –storage and yield of Chillies.
6. Climate – soil requirement –varieties / hybrids – seed rate – nursery practices – protray nursery – transplanting – manuring – irrigation –fertigation. Weeding –chemical – mechanical weed control – use of growth regulators- special horticultural practices – nutrient deficiency and their corrective measures Maturity indices- harvesting – grading, sorting – packing –storage and yield of Bhendi.

7. Climate – soil requirement –varieties / hybrids – seed rate – nursery practices – protray nursery – transplanting – manuring – irrigation –fertigation. Weeding –chemical – mechanical weed control – use of growth regulators- special horticultural practices – training and staking nutrient deficiency and their corrective measures– Maturity indices- harvesting – grading, sorting – packing –storage - yield of Gourds (Pumpkin and Ash Gourd).
8. Mid semester Examination.
9. Climate – soil requirement –varieties / hybrids – seed rate – nursery practices – protray nursery- transplanting – manuring – irrigation –fertigation. Weeding –chemical – mechanical weed control – use of growth regulators- special horticultural practices – training and staking nutrient deficiency and their corrective measures maturity indices- harvesting – grading, sorting – packing – cold storage - yield of Cucumber, Water melon and Musk melon.
10. Climate – soil requirement –varieties / hybrids – seed rate – nursery practices – protray nursery – transplanting – manuring – irrigation –fertigation. Weeding –chemical –mechanical weed control – use of growth regulators- special horticultural practices(staking training, pruning) –nutrient deficiency and their corrective measures maturity indices- harvesting – grading, sorting – packing – cold storage - yield of gourds (Ridge gourd, Bitter gourd and Bottle gourd).
11. Climate – soil requirement –varieties / hybrids – seed rate – nursery practices – protray nursery – transplanting – manuring – irrigation –fertigation. Weeding –chemical – mechanical weed control – use of growth regulators- special horticultural practices – physiological disorders nutrient deficiency and their corrective measures maturity indices- harvesting – grading, sorting – packing – cold storage - yield of Bellary Onion and Aggregatum onion.
12. Climate – soil requirement –varieties / hybrids – seed rate/ planting materials requirement – nursery sowing practices – protray nursery –transplanting – manuring – irrigation –fertigation. Weeding – chemical –mechanical weed control – use of growth regulators- special horticultural practices - physiological disorders, nutrient deficiency and their corrective measures– maturity indices- harvesting – grading, sorting – packing –storage and yield of Tapioca, Yams and Colocasia.
13. Climate – soil requirement –varieties / hybrids – seed rate – nursery practices – protray nursery – transplanting – manuring – irrigation –fertigation. Weeding –chemical –mechanical weed control – use of growth regulators- special horticultural practices (blanching) – physiological disorders, nutrient deficiency and their corrective measures– maturity indices- harvesting – grading, sorting – packing –storage and yield of Cabbage and Cauliflower.
14. Climate – soil requirement –varieties / hybrids – seed rate – nursery practices – protray nursery – transplanting – manuring – irrigation –fertigation. Weeding –chemical –mechanical weed control – use of growth regulators-– physiological disorders, nutrient deficiency and their corrective measures– maturity indices- harvesting – Grading, Sorting – Packing – cold storage - yield of Potato.
15. Climate – soil requirement –varieties / hybrids – seed rate – nursery practices – protray nursery – transplanting – manuring – irrigation –fertigation. Weeding –chemical –mechanical weed control – use of growth regulators- special horticultural practices(thinning, staking and pruning) – maturity indices- harvesting – Grading, Sorting – Packing – cold storage - yield of Carrot, Radish and Beet root.
16. Climate – soil requirement –varieties / hybrids – seed rate – nursery practices – protray nursery – transplanting – manuring – irrigation –fertigation. Weeding –chemical –mechanical weed control – use of growth regulators- special horticultural practices(thinning, staking and pruning) – maturity indices- harvesting – Grading, Sorting – Packing – cold storage - yield of Amaranthus and Moringa.
17. Climate – soil requirement –varieties / hybrids – seed rate – nursery practices – protray nursery – transplanting – manuring – irrigation –fertigation. Weeding –chemical –mechanical weed control – use of growth regulators- special horticultural practices –maturity indices- harvesting – Grading, Sorting – Packing – cold storage - yield of Cluster beans, lab lab, Peas and Beans.

Practical schedule

1. Learning varieties / hybrids identification by special features in tomato and brinjal
2. Learning varieties / hybrids identification by special features in chillies and bhendi
3. Learning varieties / hybrids identification by special features in gourds(pumpkin, ash gourd,bitter gourd, ridge gourd bottle gourd, water melon and musk melon)
4. Learning varieties / hybrids identification by special features in bellary and aggregatum onion
5. Learning varieties / hybrids identification by special features in tapioca, yams and colocasia
6. Learning varieties / hybrids identification by special features in amaranthus and annual moringa
7. Learning varieties / hybrids identification by special features in cabbage and cauliflower
8. Learning varieties / hybrids identification by special features in peas and beans
9. Learning varieties / hybrids identification by special features in potato, carrot, beet root and radish
10. Learning varieties /hybrids identification by special features in cluster beans and lab lab
11. Preparation of nursery beds protray nursery and sowing
12. Preparation of main field for direct sown vegetables (bhendi and amaranthus)
13. Preparation of main field for transplanted vegetables (tomato and brinjal)
14. Preparation of main field for tuber crops (tapioca, yams and colocasia)
15. Practiticing application of manures and fertilizers
16. Practicing lay out of kitchen / Nutrition garden
17. Practicing different methods of irrigation.
18. Mid semester examination
19. Hands on training in fertigation
20. Calculation for foliar application of nutrients and practicing
21. Calculation for foliar application of plant growth regulators and practicing
22. Identification of different physiological disorders, nutrient deficiencies and their management
23. Practicing manual weeding and earthing up
24. Spray volume calculation and application of herbicides for direct sown and transplanted Vegetables
25. Practicing training and support for hybrid tomato/brinjal
26. Practicing pandal erection and support for gourds
27. Assessing the maturity indices and harvesting of tomato, chilli, brinjal and onion
28. Assessing the maturity indices and harvesting of root and tuber vegetables
29. Assessing the maturity indices and harvesting of gourds and leafy vegetables
30. Grading, sorting and packing of vegetables
31. Working out economics of vegetable cultivation
32. Visit to commercial nursery unit
33. Visit to shade net / Poly house unit
34. **Final practical examination**

References

- Veeraraghavathatham, D M. Jawaharlal and Seemanthini Ramadhas 2004. A Guide on Vegetable Culture. Suri Associate, Coimbatore.
- www. agritechportal. tnau.ac.in

HOR H19 Crop Production – 1 (Vegetable crops) 0+2

Practical

Preparation of raised nursery bed - Seed treatment - container sowing - pest and disease management in nursery - Field lay out and main field preparation - ridges and furrows - manuring – direct sowing, transplanting - manuring - irrigation – earthing up and weedcontrol - herbicide application – Special horticultural practices (Training/ staking/pruning) - Foliar application of nutrients and growth regulators - recording observations on growth, yield and quality – nutrient deficiency, physiological disorders and their management - pest and disease management – maturity indices – harvesting techniques ,grading, sorting and packing – working out cost of cultivation - visit to commercial nursery unit and precision farming fields. **Transplanted vegetable crops :**tomato / brinjal / /cabbage (Any one) **Direct sown vegetable crops:** bhendi / cluster beans /radish/amaranthus(Any one)

Practical schedule

1. Nursery practices for production of seedlings in containers
2. Raised bed nursery preparation for vegetable crops
3. Pest and disease management in nursery
4. Visit to commercial nursery units
5. Practicing layout of main field and Practicing main field preparation
6. Practicing the basal application of manures
7. Preparation of ridges and furrows / paired row systems
8. Practicing direct sowing
9. Practicing transplanting techniques
10. Practicing irrigation methods
11. Formulating and practicing fertigation schedule to vegetable crops
12. Practicing earthing up
13. Practicing hand weeding
14. Spray volume calculation and application of herbicides
15. Recording observations on growth parameters.
16. Practicing foliar application of nutrients /growth regulators
17. **Midsemester Examination**
18. Practicing special horticultural practices for vegetables (training/staking/ pruning.
19. Identification of different physiological disorders and their management
20. Identification of different nutrient deficiency symptoms and their management
21. Identification of important pests and their management
22. Spray volume calculation and application of pesticides
23. Identification of important diseases and their management
24. Spray volume calculation and application of fungicides
25. Use of bio control agents
26. Assessing the maturity indices of vegetables
27. Assessing the quality parameters of vegetable crops

28. Recording observations on yield parameters.
29. Practicing harvesting techniques in vegetable crops
30. Practicing grading, sorting, and packing techniques of vegetable crop.
31. Visit to commercial packing units of vegetable crops
32. Working out the economics of cultivation of direct sown and transplantable vegetable crops
33. Visit to precision farming fields
34. Final Practical Examination

HOR H20 Flower crops Production Technology 1+1

Theory

Scope and importance of commercial flower crops - Study of cultural requirements – Rose, Jasmine, Tuberose, Chrysanthemum, Marigold, Crossandra, Celosia, Nerium and Gomphrena. Floral concrete,pigment and dye extraction from loose flowers Introduction to protected structures for cut flower production — Study of cut flower production of Rose, Carnation, Gerbera, Chrysanthemum, Orchids, Anthurium, Gladiolus, Lilium, Alstroemeria, Heliconia and BOP . Post harvest management of cut flowers — Floral decorations, bouquets and dry flowers – Grading, packing and marketing of flowers.

Practical

Loose flowers - Identification of commercial varieties – propagation and nursery practices – Seed treatment and sowing – planting material preparation : cuttings, layers and bulbs – Practices in field preparation, layout and planting of loose flowers – Practices in manuring, weeding, irrigation etc. Practices in special operations: training, pruning and pinching, harvesting and postharvest handling – grading, packaging and storage Cut flowers - Identification of commercial varieties - Protected structures – Practices in propagation - Fumigation, growing media and bed preparation – Practices in after cultivation practices (manuring, weeding, irrigation etc.) – Practices in special operations : growth regulator application, netting, pinching, disbudding etc. - harvesting and postharvest handling – grading, packaging and storage of cut flowers Visit to fields of commercial loose flower crops, green house cultivation units and concrete & dye / pigment extraction units – Working out input requirements and cost benefit ratio for loose and cut flowers.

Theory Schedule

1. Scope and importance of commercial flower crops.
2. Rose – importance and uses – commercial varieties – Soil and climate- propagation – nursery and planting – intercultural operations – Harvest and yield.
3. Jasmine - importance and uses – commercial varieties – Soil and climate- propagation – nursery and planting – intercultural operations – Harvest and yield.
4. Tuberose and Chrysanthemum - importance and uses – commercial varieties – Soil and climate- propagation – nursery and planting – intercultural operations – Harvest and yield.
5. Marigold and Crossandra - importance and uses – commercial varieties – Soil and climate propagation – nursery and planting – intercultural operations – Harvest and yield.
6. Celosia, Nerium and Gomphrena - importance and uses – commercial varieties – Soil and climate- propagation – nursery and planting – intercultural operations – Harvest and yield
7. Introduction to protected structures for cut flower production
8. Cut rose - importance and uses – commercial varieties – environmental factors - propagation – media and planting – intercultural operations – Harvest and yield.
9. Carnation - importance and uses – commercial varieties – environmental factors - propagation – media and planting – intercultural operations – Harvest and yield.
10. Gerbera - importance and uses – commercial varieties – environmental factors - propagation – media and planting – intercultural operations – Harvest and yield.
11. Cut chrysanthemum - importance and uses – commercial varieties – environmental factors – propagation – media and planting – intercultural operations – Harvest and yield.

12. Orchids - importance and uses – commercial varieties – environmental factors - propagation – media and planting – intercultural operations – Harvest and yield.
13. Anthurium and lilium - importance and uses – commercial varieties – environmental factors – propagation – media and planting – intercultural operations – Harvest and yield.
14. Open field cut flowers – Gladiolus, Alstroemeria, Heliconia and BOP- importance and uses – commercial varieties – environmental factors - propagation – media and planting – intercultural operations – Harvest and yield.
15. Postharvest management of cut flowers.
16. Floral decorations, bouquets and dry flowers
17. Grading, packing and marketing of flowers.

Practical schedule

1. Identification of commercial varieties – practices in propagation - pruning practices of Rose
2. Jasmine spp - Identification commercial varieties – practices in propagation – pruning practices
3. Tuberose and Chrysanhemum - Identification of commercial varieties – practices in propagation – tuber treatment and sowing – pinching and disbudding.
4. Marigold and crossandra- Identification of commercial varieties – practices in nursery mangaement – pinching and disbudding
5. Celosia, Nerium and Gomphrena - Identification of commercial varieties – practices in nursery management and propagation – pinching and disbudding
6. Visit to commercial loose flower cultivation fields.
7. Cut Rose - identification of commercial varieties – practices in propagation - fumigation, media and bed preparation – after cultivation practices – special operations : growth regulator application, bending, pruning etc.
8. Carnation - identification of commercial varieties – practices in propagation - fumigation, media and bed preparation – after cultivation practices – special operations : growth regulator application, netting, pinching, etc. –
9. Gerbera - identification of commercial varieties – practices in propagation, fumigation, media and bed preparation – special operations : growth regulator application etc.
10. Chrysanthemum - identification of commercial varieties – practices in propagation, fumigation, media and bed preparation – special operations: growth regulator application, pinching, disbudding etc.
11. Orchids - identification of commercial varieties – practices in propagation, media and pot mixture preparation – special operations : potting, repotting, nutrient application etc.
12. Anthurium - identification of commercial varieties – practices in propagation - media and pot mixture preparation – special operations : potting, repotting, nutrient application etc.
13. Lilium – identification of commercial varieties – practices in propagation, fumigation, media and bed preparation – special operations : bulb treatment, growth regulator application etc.
14. Gladiolus, Alstroemeria, Heliconia and BOP – identification of commercial varieties – practices in propagation, bed preparation and planting
15. Practices in postharvest management of cut flowers (precooling, grading, pulsing, storage, packaging and marketing of cut flowers)
16. Visit to fields of commercial loose flower crops, green house cultivation units and concrete & dye pigment extraction units
17. Working out input requirements and cost benefit ratio for loose and cut flowers.

References

- Aroara, J.S 2010, Introductory Ornamental Horticulture. Kalyoni publishers, New Delhi, India
- Kumar, N. 2011. Introduction to Horticulture, Oxford and IBH Publication, New Delhi

HOR H21 Crop Production - 2 (Flower crops) 0 + 2

Practical

Practical training and experience in production of commercial annual crops (Marigold, Celosia, Gomphrena, etc.) – seed treatment – raising nursery - sowing seeds- field preparation- transplanting, basal manuring, irrigation, weed control, top dressing, after culture – growth regulators - plant protection – maturity indices and harvesting –maintenance of cultivation sheet - working out cost benefit ratio.

Practical schedule

1. Practice in raising nursery for transplanted annual flowers.
2. Seed treatment and sowing of seeds in nursery.
3. Field preparation – ploughing, formation of irrigation channels.
4. Practice in application of FYM and its incorporation in main field.
5. Formation of flat beds and channels.
6. Application of basal dressing of fertilizers.
7. Practice in top dressing and earthing up operation.
8. Identification of different nutrient deficiency symptoms and their management
9. Practice in transplanting of annual flower seedlings.
10. Practice in hand weeding and Spray volume calculation for herbicide application.
11. Practice in for herbicide application.
12. Practicing the special horticultural practices - staking
13. Practicing the special horticultural practices – pinching/ disbudding
14. Practice in scheduling of irrigation.
15. Practice in gap filling operation.
16. Practice in PGR preparation and application.
17. **Mid semester examinations**
18. Identification of important pests and their management
19. Spray volume calculation and application of pesticides
20. Identification of important diseases and their management
21. Spray volume calculation and application of fungicides Use of bio control agents
22. Practices in pesticide, fungicide application and other inter cultural operations.
23. Assessing maturity indeces and practice in harvesting
24. Assessing the harvesting stage of flowers for different markets
25. Practicing harvesting techniques in flower crops
26. Practicing grading, sorting, and packing techniques of flower crops.
27. Assessing the quality parameters of flower crops
28. Recording observations on yield parameters.
29. Practice in seed extraction, processing, cleaning and packaging
30. Cost economics of production
31. Visit to commercial packing units of flower crops
32. Visit to flower market
33. Visit to precision farming fields
34. Final Practical Examination

References

- Arora, J.S. 1999. Introduction to ornamental horticulture.Kalyani Publishers, Ludhiana. India.

HOR H22 Spice crop Production Technology 1+1

Theory

Scope and importance of spices- area – production and productivity in Tamil Nadu – Study of cultural operations for the following spice crops with reference to soil, climate, varieties, propagation, cultural practices- training and pruning – harvesting- yield – postharvest handling: processing – grading and packing- GAP in spice production.

Crops:

Pepper, Cardamom, Turmeric, Ginger, Clove, Nutmeg, Cinnamon, Tamarind, Allspice, Curry leaf, Coriander, Fenugreek, Fennel, Cumin and Paprika.

Practical

Identification of different spice crops and finished products. Propagation techniques, selection of planting material, sowing, important cultural practices, Post harvest handling of important spice crops - Visit to various spice growing areas and spice industries.

Crops:

Pepper, Cardamom, Turmeric, Ginger, Clove, Nutmeg, Cinnamon, Tamarind, Allspice, Curryleaf, Coriander, Fenugreek, Fennel, Cumin and Paprika.

Theory schedule

1. Scope and importance of spices –area - production and productivity.
2. Cultural practices of Pepper
3. Cultural practices of Cardamom
4. Cultural practices of Turmeric
5. Cultural practices of Ginger
6. Cultural practices of Clove
7. Cultural practices of Nutmeg
8. Cultural practices of Cinnamon
9. Mid-semester examination
10. Cultural practices of Tamarind
11. Cultural practices of Curryleaf and AllSpice
12. Cultural practices of Coriander
13. Cultural practices of Fenugreek
14. Cultural practices of Fennel and Cumin
15. Cultural practices of paprika
16. GAP in Spice production
17. Value addition in spice crops

Practical schedule

1. Identification and description of different spice crops.
2. Rapid multiplication techniques in pepper and cardamom.

3. Harvesting and postharvest processing of turmeric.
4. Harvesting and curing techniques of ginger.
5. Training and pruning of clove.
6. Softwood grafting and top working in nutmeg.
7. Harvesting, post harvesting and grading of cinnamon.
8. Propagation techniques and harvesting in curry leaf.
9. Mid-semester examination
10. Propagation practices of Tamarind.
11. Harvesting and curing of allspice.
12. Seed treatment and sowing of coriander.
13. Seed treatment and sowing of fenugreek.
14. Nursery practices in paprika.
15. Visit to various spice growing areas.
16. Visit to spice industries.
17. Final Practical Examination

References

- Kumar, N. Md. Abdul Khader, P.Rangasamy, and I. Irulappan, 2001. Spices, Plantation Crops, Medicinal and Aromatic Plants, Rajalakshmi Publications, Nagercoil.

AEN H12 Pests of Horticultural crops and their Management 1+2

Theory

Pest - categories – causes for pest for outbreak. Pest management - principles and components .Natural enemies in pest suppression. IPM – Management strategies for important insect pests groups – chewing insects - stem borers –fruit borer – sap feeders of important fruit, vegetable, spices, medicinal and plantation crops- Special pest management strategies in ware house, green house, poly house. Management techniques for plant parasitic nematodes.

Practical

Study of a typical insect pest- characters- adaptations- Life history and immature stages of Insects.Differentiation of harmful pests, their natural enemies and pollinators. Collection and preservation of insect pests. Identification of symptoms of attack, nature of damage injurious life stages and management of important pests of important fruit crops, vegetable crops, flower crops, plantation crops, spices , medicinal plants and lawn occurring in field and storage. Non- insect pests – study of important rodents, mites and plant parasitic nematodes of horticultural crops. Sample collection and extraction methodologies for plant parasitic nematodes.

Assignments:

Each student has to collect and rear 15 immature stages of important insect pests injurious to horticultural crops and also 50 adult insects affecting horticultural crops

Theory schedule

1. Definition of pest – pest categories – causes for pest out break
2. Pest management – Principles and components
3. Role of natural enemies in pest suppression
4 . Methods of integration of chemical control with other methods of pest management
5. IPM for chewing insects
6. IPM for sap feeding insects
7. Management fruit flies
8. Management of longicorn borers in fruit crops
9. Mid semester examination
10. Management of moth borers of vegetables
11. IPM for mealy bugs
12. IPM for diamond back moth
13. Management of stored products pests
14. Pest management in green house and lawns
15. IPM for phytophagous mites
16. Management of plant parasitic nematodes
17. Final theory examination

Practical schedule

1. Identification of various insect groups inimical to horticultural crops.

2. Grouping of insect pests based on their feeding behavior
3. Life cycle and immature stages of important insect groups
4. Collection, preservation and rearing of insect pests
5. Field diagnosis of harmful insects, their natural enemies and pollinators
6. Insect pests of Mango, Papaya and their management
7. Insect pests of Banana, Grapevine and their management
8. Insect pests of Citrus, Pomegranate and their management
9. Insect pests of Sapota, Amla Guava, Jack and their management
10. Insect pests of apple, pear, and their management
11. Insect pests of Brinjal, Chillies , Tomato and their management
12. Insect pests of Bhendi, Drum stick and their management
13. Insect pests of Sweet potato, Tapioca and their management
14. Insect pests of Cucurbitaceous vegetables and their management
15. Insect pests of Potato, Cabbage, Cauliflower, Peas, Beans) and their management
16. Insect pests of loose flowers – (Rose Jasmine. Chrysanthemum, Marigold, Crossandra) Tube rose and their management
17. Insect pests of cut flowers –(Rose, Carnation, Gerbera , Chrysanthemum) and their management
18. Mid semester examination.
19. Insect pests of Turmeric, Cardamom, Ginger. and their management
20. Insect pests of Seed spices, pepper and their management
21. Insect pests of Coffee, Tea and their management
22. Insect pests of Cashew, Cocoa and their management
23. Insect pests of Coconut, Arecanut and their management
24. Insect pests Gloriosa, Coleus, Senna, *Solanum nigrum* and their management
25. Pests of lawn and their management
26. Insect pests of stored horticulture products and their management
27. Mite pests of horticultural crops and their management.
28. Rodent pests of horticultural crops and their management.
29. Extraction of nematodes from soil and plant samples.
30. Feeding habits and life cycle of Root knot, Cyst, Reni form, and Lesion nematode.
31. Nematode pests of fruit crops (Banana, Papaya, Grape vine and Citrus) and plantation crops (Coconut, Arecanut, Tea, Coffee and Cardamom) and their management.
32. Nematode pests of vegetable crops (Tomato,Bhendi, Brinjal, Carrot, Cucurbits, Beans, Potato, Beet root) and their management.
33. Nematode pests of flowers (Tuberose, Crosandra, Carnation, Gerbera) and their management
34. **Final practical examination.**

References

- Ragupathy.A., S.Palanichamy, N.Chandramohan and K.Gunathilagaraj 2003. A Guide on Crop Pests, M/S.Sheeba Printer, Coimbatore.276 p.

PAT H12 Diseases of Horticultural crops and their Management 1+2

Theory

Etiology, symptoms and integrated management of important diseases due to fungi, bacteria, viruses, phytoplasma, phanerogamic parasites of the following horticultural crops.**Fruits:** Mango, Banana, Citrus, Grapes, Guava, Sapota, Pomegranate, Papaya, Jack, Pineapple, Ber, Apple, Pear, Plum **Vegetables:** Brinjal, Tomato, Bhendi, Cucurbits, Crucifers, Beans, Peas, Potato, Sweet potato, Radish and Cassava. **Mushroom:** Cultivation techniques of and *Pleurotus, Agaricus, Calocybe* and *Volvariella* **Spices and condiments:** Onion, Garlic, Chillies, Cardamom, Pepper, Turmeric, Ginger, Betelvine, Coriander, Fenugreek, Clove and Nutmeg **Plantation crops:** Tea, Coffee, Cocoa, Rubber, Ccoconut Arecanut and Cashew **Flowers :** Jasmine,Rose, Crossandra, Chrysanthemum, Tube rose, Carnation, **Medicinal plants**: Gloriosa, Stevia, Senna, Coleus, *Aloe vera, Solanum nigrum* and Withania.

Practical

Identification, Etiology, symptoms, Mode of spread, survival and management of major of Fruits, Vegetables, Plantation crops, Spices and condiments, Flowers and medicinal plants. Cultivation techniques for mushroom Collection and preservation of diseased specimens (**Students should submit 50 preserved plant disease specimens)**

Lecture schedule

Etiology, symptoms and management of diseases of the following crops
1. Mango and Banana.
2. Citrus and Grapes.
3. Guava, Sapota, Pomegranate,
4. Jack, Papaya, Pineapple and Ber
5. Apple, Pear and Plum
6. Tomato and Brinjal
7. Cucurbits and Crucifers
8. Potato, Sweet potato and Tapioca
9. **Mid-semester Examination**
10. Yam, Bean and Peas
11. Mushroom cultivation: *Pleurotus* and *Calocybe*
12. Onion, Garlic and Chillies and Betelvine.
13. Turmeric, Ginger, Cardamom, Coriander, Clove, and Nutmeg
14. Tea, Coffee and Rubber
15. Coconut, Arecanut and Cashew
16. Rose, Jasmine, Crossandra, chrysanthemum, gerbera, Tuberose and Carnation.
17. Post harvest diseases of fruits and vegetables

Practical Schedule

Identification, Etiology, symptoms, Mode of spread, survival and management of major diseases of the following crops
1. Diseases of Mango
2. Diseases of Banana

3. Diseases of Citrus and Grapes
4. Diseases of Guava, Sapota, Pomegranate and Jack
5. Diseases of Papaya, Pineapple and Ber
6. Diseases of Apple Pear and plum
7. Diseases of Post harvest diseases – Apple, Mango, Banana, Citrus, Papaya and Grapes
8. Diseases of Brinjal and Bhendi
9. Diseases of Tomato
10. Diseases of Cucurbits
11. Diseases of Cabbage, Cauliflower and Radish
12. Diseases of Potato
13. Diseases of Sweet potato and Cassava
14. Diseases of Yam , Bean and Peas
15. Mushroom cultivation :*Agaricus*
16. Mushroom cultivation :*Pleurotus and Calocybe*
17. Mushroom cultivation :*Volvariella*
18. Biotic and abiotic stresses of mushroom
19. Diseases of Chilles
20. Diseases of Onion and Garlic
21. Diseases of Pepper and Betelvine
22. Diseases of Turmeric and ginger.
23. Diseases of Clove, Nutmeg, Fenugreek and Coriander
24. Diseases of Tea and Coffee.
25. Diseases of Coconut and Arecanut
26. Diseases of Rubber
27. Diseases of Cocoa and Cardamom
28. Diseases of Jasmine and Rose.
29. Diseases of Crossandra,Chrysanthemum, Marigold, Tuberose, and Carnation.
30. Diseases of Gloriosa, Stevia, Senna and Withania
31. Diseases of Coleus, *Aloe vera* and *Solanum nigrum*
32. Diseases of Horticultural crops under protected cultivation
33. Field visit
34. Practical examination

References

- Arjunan.G. Karthikeyan, G, Dinakaran ,D. Raguchander,T. 1999 Diseases of Horticultural Crops, AE Publications, Coimbatore.

1. COMMERCIAL PRODUCTION OF BIO-CONTROL AGENTS (0+2)

Practical

Introduction to bio-control agents – Importance – History and development - classical examples of bio-control agents – Role in pest and disease management – Categories of bio-control agents. Setting up a bio-control laboratory. Mass culture of tobacco caterpillar (*Spodoptera litura*) and gram pod borer (*Helicoverpa armigera*)- synthetic diet – mass production of SlNPV and HaNPV. Mass production of *Trichogramma* spp., *Chrsoperla*, coccinellid predators, *Trichoderma viride, Pseudomonas fluorescens* and Entomo-pathogenic nematodes. Project preparation.

Practical schedule

1. Bio-control – importance – history – successful bio-control programmes
2. Role of bio-control agents in pest management. Basic facilities required for setting up a bio-control laboratory.
3. Rearing host insects for pathogen production – facilities and materials required for rearing the insect on natural host and synthetic diet
4. Acquiring mother culture of *Spodoptera litura* and *Helicoverpa armigera*. Conditioning for egg laying
5. Collection of eggs – disinfecting eggs- preparation for hatching
6. Synthetic diet preparation for host insects
7. Releasing hatched out larvae in synthetic diet or natural hosts
8. Maintaining the culture – sanitation and cleanliness of rearing unit
9. Harvesting pupae and preparation of adult emergence cage
10. Preparation for mating cages – Releasing adults with oviposition substrate. Collection of eggs
11. Acquiring nucleus NPV inoculum – inoculation of NPV in natural host plant/ synthetic diet
12. Culturing the virus-inoculated larvae. Harvesting virosed larvae
13. Preparation of virus suspension for field application and maintaining nucleus virus culture
14. Mass culturing of *Corcyra cephalonica* preparation of sorghum/ cumbu grain trays for feeding the caterpillars. Releasing eggs in the grains in sulphur treated broken grains
15. Preparation of mating cages. Sanitation of rearing unit. Control of parasitoids
16. Collection of adults, releasing in mating cages and collection of eggs
17. Mid semester examination
18. Separation of eggs- cleaning- sterilization – preparation of egg cards. Acquiring nucleus culture of *Trichogramma* spp
19. Parasitizing the egg cards with nucleus culture. Sanitation of culture room
20. Collection of parasitized egg cards – Field release
21. Mass rearing of predatory coccinellid. Field collection of coccinellids – preparation of prey insect – field collection of mealy bugs and culturing on pumpkin
22. Insect cages for rearing -release of coccinellids on mealy bugs and culturing the predator

23. Harvesting beetles- field release. Maintaining the mother culture for further culturing
24. Bio-control agents for plant pathogens-*Trichoderma viride* and *Pseudomonas fluorescens*. Laboratory requirement – materials required
25. Acquiring *Trichoderma* culture – aseptic condition for a maintaining pure culture – media preparation
26. Inoculation of nucleus culture in the media. Culture room sanitation and conditioning. Observation on growth characteristics
27. Harvesting the culture- preparation for field application – formulation – field application
28. *Pseudomonas fluorescens*. Acquiring culture- media preparation – inoculation
29. Laboratory sanitation and maintenance of culture. Observation on growth characteristics
30. Harvesting the culture- preparation for field application – formulation – field application
31. Packing the formulations of *Trichoderma viride* and *Pseudomonas fluorescens*. Storage for field use
32. Entomopathogeic nematodes - identification – Acquiring nucleus culture - Method of mass multiplication in insect hosts. Field release procedures
33. Cost analysis - Project preparation for setting a commercial laboratory
34. Final practical examination.

2. COMMERCIAL PRODUCTION OF SPAWN AND MUSHROOM (0+2)

Practical

Mushroom- introduction, importance-present production and trade, scope for export, markets for mushroom and mushroom products – Mushroom morphology : common edible mushrooms - *Pleurotus, Calocybe* - poisonous mushrooms - Laboratory techniques: equipments used, sterilization of glassware, media preparation, pure culture techniques, sub-culturing and storage. Spawn: types of spawn, mother spawn and bed spawn. Cultivation: Oyster mushroom, Milky mushroom – Problems in cultivation: weed moulds, diseases, pests and abiotic disorders - Uses of mushroom : as food, nutriceutical and pharmaceutical values, composting coir-pith and other agro-wastes – Post harvest technology: methods of preservation and value addition Cost analysis and Project preparation.

Practical Schedule

1. Introduction to mushroom science, importance, contribution from related fields, global production, domestic and international trade for mushrooms and mushroom products
2. Mushroom morphology -Identification of common edible and Poisonous mushrooms
3. Equipments used in mushroom laboratory, physical and chemical sterilization techniques
4. Preparation of culture media
5. Pure culture technique – tissue isolation
6. Sub-culturing
7. Short term and long term preservation of mushroom cultures
8. Mother spawn production - demonstration

9. Mother spawn production – self learning
10. Bed spawn production - demonstration
11. Bed spawn production – self learning
12. Oyster mushroom cultivation – important species and varieties
13. Oyster mushroom cultivation - Cultural requirements
14. Oyster mushroom cultivation – Bed preparation
15. Observation on spawn run, cropping room requirements and maintenance
16. Harvesting and aftercare of oyster mushroom beds
17. Mid Semester Examination
18. Milky mushroom – special features, important species and varieties
19. Milky mushroom production - cultural requirements
20. Substrate preparation – quality analysis
21. Casing soil preparation – Casing soil characters and purpose of casing
22. Milky mushroom production – bed preparation
23. Milky mushroom production – observations on spawn running and cropping
24. Harvesting of milky mushrooms and after care
25. Constraints in mushroom production – weed moulds infesting spawn and their management
26. Weed moulds mushroom infesting mushroom beds and their management
27. Diseases of oyster and milky mushrooms
28. Abiotic disorders of oyster and milky mushroom
29. Insect pests of oyster and milky mushroom and their management
30. Uses of mushrooms - Nutritional and medicinal value
31. Recipe preparation with oyster and milky mushrooms, drying, caning and value added mushroom products
32. Methods of composting coir pith and other agro-wastes
33. Cost analysis and project preparation - sources of finance –acquisition
34. Final practical examination

3. FRUIT AND VEGETABLE PROCESSING (0+2)

Practical

Floor layout of Fruit and Vegetable processing Industry – Equipments and Accessories used in processing Industry – Preparation of Squash, Syrup, Cordial, Nectar, Ready to serve beverages (RTS) – Fruit juice concentrate – Paste, Powder, Bar – Jam, Jelly, Marmalade and Candy, Preserve – Pickles – Oil, Salt and vinegar – Tomato products – Ketch up. Sauce, Puree and Paste – Canning of Fruit and Vegetables – Dehydrated Fruit and Vegetables and Re-hydration – Preservation by low temperature – cut-out analysis of canned Fruit and Vegetables – Evaluation of Frozen Fruit and Vegetables – Osmotic dehydration – Visit to Fruits and Vegetable processing Industry – Project preparation.

Practical Schedule

1. Floor Layout for Fruit and Vegetable processing Industry
2. Equipments and accessories used in Fruit and Vegetable processing Industry
3. Preparation of Squash as per Fruit Products Order (FPO) specifications
4. Preparation of Ready to serve beverages (RTS)
5. Preparation of Fruit syrup (Sharbat)
6. Preparation of Cordial
7. Preparation of Nectar
8. Preparation of Fruit Juice concentrate – Paste

9. Preparation of Fruit powder
10. Preparation of Fruit bar
11. Preparation of Jam
12. Preparation of Jelly and Marmalade
13. Preparation of Candy
14. Preparation of Preserves with sugar / Honey
15. Preparation of Synthetic syrup using different flavours
16. Preparation of Pickle – Salt, Oil
17. Mid semester Examination
18. Preparation of Pickle – Vinegar
19. Preparation of Pickle – Hot and Sweet
20. Preparation of Tomato sauce
21. Preparation of Tomato Ketch up
22. Preparation of Tomato Paste and puree
23. Canning of Fruit
24. Canning of Vegetable
25. Preparation of Dried and Dehydrated Fruits
26. Preparation of Dried and Dehydrated Vegetables
27. Low Temperature preservation of Fruits and Vegetables and Evaluation of natural preservatives
28. Cut-out analysis of canned Fruits and Vegetables
29. Evaluation of Frozen Fruits and Vegetables
30. Osmotic Dehydration
31. Re-hydration
32. Visit to Fruit and Vegetable processing Industry
33. Project preparation
34. Final Practical Examination

4. HYBRID SEED PRODUCTION (0+2)

Practical

Hybrids – Production of hybrid varieties – Development of inbreeds – Single cross evaluation – Prediction of double cross performance – Production of hybrid seed – Cytoplasmic, Genetic male sterility – Maintenance of Male sterile lines – Production of single cross hybrids – Production of double cross hybrid varieties - Manual emasculation and / or Pollination – Chemically induced male sterility – Merits and demerits of hybrid varieties – Floral biology, anthesis, pollination, selfing, emasculation and crossing technique in Rice, Sorghum, Pearl millet, Red gram, Castor, Sunflower, Cotton, Tomato, Bhendi.

Harvesting – Physical and chemical indices – Extraction techniques – Seed processing – Use of cleaner, grader – Seed treatment – Seed packaging – Seed storage – Sanitation – Certification procedure – Visit to seed growers – Visit to seed processing units – Regulated market.

Practical schedule

1. Hybrid – Introduction
2. Hybrid varieties
3. Procedures in the development of hybrids
4. Procedures in the development of varieties

5. Development of inbreeds
6. Single cross evaluation
7. Double cross evaluation
8. Cytoplasmic male sterility
9. Genetic male sterility
10. Chemically induced male sterility
11. Maintenance of Male sterile lines
12. Production of single cross hybrids
13. Production of double cross hybrid varieties
14. Production of hybrid seed
15. Manual emasculation and / or Pollination
16. Merits and Demerits of hybrid varieties
17 Mid Semester Examination
18. Floral biology, anthesis pollination, selfing and crossing technique in Rice
19. Floral biology, anthesis pollination, selfing and crossing technique in Sorghum
20. Floral biology, anthesis pollination, selfing and crossing in Pearl millet
21. Floral biology, anthesis pollination, selfing and crossing technique Red gram
22. Floral biology, anthesis, pollination, selfing, technique in Castor
23. Floral biology, anthesis, pollination, selfing, technique in Sunflower
24. Floral biology, anthesis, pollination, selfing, emasculation and crossing technique in Cotton
25. Floral biology, anthesis, pollination, selfing, and crossing technique in Tomato
26. Floral biology, anthesis, pollination, selfing, emasculation and crossing technique in Bhendi.
27. Harvesting methods - Physical and chemical indices – Extraction techniques
28. Seed processing – Use of cleaner cum grader
29. Seed treatment – Seed packaging
30. Seed storage – Sanitation – Certification procedure
31. Visit to seed growers
32. Visit to seed processing units
33. Visit to regulated market.
34. Final Practical Examination.

5. NURSERY TECHNOLOGY (0+2)

Practical

Selection of nursery area – preparation of seeds and seed treatment – Sowing and raising of rootstocks (Fruits and Flower Crops) – Application of Liquid Manure and plant protection of rootstock – Potting materials and Preparation of pot mixture – Potting of Rootstock and Hardening – Selection of Scion Plants and Grafting, Aftercare of Grafted Plants, Graft Separation and Hardening – Preparation of Cuttings of Ornamental Plants, Treating the Cuttings with growth regulators and Planting in Mist Chamber in Beds/Polybags, Potting of Rooted Cuttings and Hardening – Air Layering of Ornamental/Fruit Crops – Budding of Ornamental Plants (Rose) – Maintenance of Potted Plants – Packing and Marketing – Cost Analysis.

Practical schedule

1. Selection of Nursery Area
2. & 3. Preparation of Seeds and Seed Treatment
4. 5 & 6. Sowing and Raising of Rootstocks (Fruits and Flower Crops)
7. & 8. Application of Liquid Manure and Plant Protection of Root Stock
9. 10. & 11. Potting Materials and Preparation of Pot Mixture – Potting of Root Stock and Hardening
12. 13. & 14. Selection of Scion Plants and Grafting
15. & 16. Aftercare of Grafted Plants
17. Mid semester Examination
18. & 19. Graft Separation and Hardening
20. & 21. Preparation of Cuttings of Ornamental Plants
22. 23. & 24. Treating the Cuttings with growth regulators and Planting in Mist Chamber in Beds/Polybags
25. & 26. Potting of Rooted Cuttings and Hardening
27. & 28. Air Layering of Ornamental/Fruit Crops
29. & 30. Budding of Ornamental Plants (Rose)
31. Maintenance of Potted Plants
32. Packing and Marketing
33. Cost Analysis
34. Final Practical Examination

6. ORGANIC COMPOSTING (0+2)

Practical

Agricultural, Industrial and Urban wastes - Nutrient potential of different organic manures – Preparation of FYM Compost – Composting methods - Preparation of enriched FYM – Coirpith composting – Sugarcane trash – Pressmud - Farm wastes and farm weeds - Parthenium composting – Determination of maturity indices of composts – Commercial utility of organic manures – Visit to compost yard. Introduction to vermicompost – Types of Vermicompost - Materials for vermicomposting. Preliminary treatment of composting material – Small Scale vermicomposting – Large scale vermicomposting – Other types of vermicomposting – Requirements for vermicomposting – Bedding materials, container, pH, Moisture content, Temperature – Cover feed substrates - Selection of right type of worm species – Preparation of vermicompost beds – Collection of Vermicompost – Vermicompost efficiency – Transportation of live worms – Application of vermicompost – Visit to Vermicompost yard – Cost Analysis.

Practical schedule

1. Agricultural, Industrial and Urban wastes and nutrient potential of different organic manures
2. General methods of composting, composting process and factors affecting composting
3. Preparation of FYM Compost
4. Composting methods – FYM
5. Preparation of enriched FYM
6. Preparation of enriched FYM – Continued
7. Preparation of Coirpith composting
8. Preparation of Sugarcane trash compost
9. Preparation of Pressmud Compost
10. Composting of farm wastes and farm weeds
11. Preparation of Parthenium compost
12. Determination of maturity indices of compost
13. Preparation of organic manure for commercial purposes
14. Visit to compost yard
15. Introduction to Vermicompost – Relative merits
16. Types of Vermicompost
17. Mid semester Examination
18. Materials for Vermicomposting
19. Preliminary treatment of composting material
20. Small scale Vermicomposting
21. Large scale Vermicomposting
22. Requirements for Vermicomposting
23. Bedding materials, Container, pH, Moisture content, temperature specifications
24. Cover feed substrates – Selection of right type of Worm Species
25. Preparation of Vermicompost – Pits and Beds
26. Preparation of Vermicompost – Pits and Beds
27. Preparation of Vermicompost – Pits and Beds
28. Transportation of live worms
29. Collection of Vermicompost
30. Collection of Vermicompost

31. Application of Vermicompost
32. Visit to Vermicompost yard
33. Cost Analysis
34. Final Practical Examination

BROILER PRODUCTION (0+2)

Practical

Preparation of poultry house for receiving new arrivals – Disinfection – Sanitation procedures – Arrangement of Brooders, brooding, spreading of litter and medication – Medication schedule and vaccination - broiler chicks – Measures to control respiratory problems. Coccidiosis and their management problems – Feeding, watering, spacing – Management of litter – Use of growth promoters and feed additives – Improvement of feed intake and feed conversion efficiency – Composition of broiler feeds, feeding ages and consumption levels – Commonly used ingredients in feed mixing for broilers – Least cost feed formulation – Observation on feed consumption, use of stimulants – Recording of body weight of broilers during growth - Management of broilers during summer – winter – Examination of internal organs of poultry – Common basic post mortem findings to know the cause of death – Dressing procedures to prepare ready to cook broilers – Various poultry meat preparations – Maintenance of records – Marketing of broilers – Cost analysis – Economics of broiler farming.

Practical Schedule

1. Preparation of poultry house for receiving new arrivals
2. Poultry house and disinfection
3. Poultry house and Sanitation procedures
4. Arrangement of Brooders, brooding
5. Spreading of litter and medication
6. Medication schedule to be followed
7. Vaccination schedule Breeding techniques in for broiler chicks
8. Measures to be adopted to control respiratory problems
9. Coccidiosis and their management problems
10. Feeding and watering
11. Spacing and management of litter
12. Use of growth promoters and feed additives
13. Assessment of feed intake
14. Periodical improvement of feed conversion efficiency
15. Composition of broiler starter feeds, feed consumption for 0-4 weeks of age
16. Composition of broiler finisher feeds, feed consumption for 5-8 weeks of age
17. Mid-semester examination
18. Commonly used ingredients in feed mixing for broilers
19. Least cost feed formulation
20. Observation and study of feed consumption
21. Role, importance and use of feed additives and growth promotors
22. Week-wise recording body weight of broilers 0-4 weeks
23. Week-wise recording body weight of broilers 5-8 weeks
24. Management of broilers during summer
25. Management of broilers during winter
26. Common basic post mortem findings to know the cause of death
27. Examination of internal organs of poultry

28. Mortality rate and morbidity rate assessment
29. Dressing procedures to prepare ready to cook broilers
30. Preparation of various poultry meat products
31. Maintenance of records and marketing of broilers
32. Cost analysis
33. Economics of broiler farming
34. Final practical examinations

7. ARTIFICIAL INSEMINATION AND CALF REARING (0+2)

Practical

Introduction – History of artificial insemination – Importance of artificial insemination. Basic study of the reproductive organs of a Bull/He-buffalo) – Fundamentals about semen production. Artificial vagina structure. Collection, processing for insemination – Basic knowledge about the Frozen semen straw production – Liquid Nitrogen – Cryocan – Handling of Cryocan – Storage of Frozen semen straws – Handling of Frozen semen straw – Visit to frozen semen production stations.

Basic knowledge about the reproductive organs of cows/she-buffalo – Puberty – Oestrus cycle – Oestrum – Symptoms of heat – Stages of oestrus cycle-Standing heat –Identification of Animals in "Heat"-Management of animals in "Heat". Examination of reproductive organs in slaughter house specimen – Repeated rectal examination of reproductive organs in animals going for slaughter – Inserting artificial insemination gun into female reproductive tract (repeated efforts) in animals going for slaughter. Artificial insemination technique – Visit to nearest artificial insemination center - Maintaining artificial insemination records – Non return to heat – Pregnancy examination – Study of various stages of pregnancy by rectal examination - Care and management of pregnant animals – Nearing calving animals – Calving.

Practical schedule

1. Introduction – History of artificial insemination and its Importance
2. Basic study of the reproductive organs of a bull/he-buffalo)
3. Fundamental about semen production
4. Semen collection, Artificial vagina structure-processing for insemination.
5. & 6. Basic knowledge about the Frozen semen straw production – Liquid Nitrogen
7. Cryocan – Handling of cryocan
8. & 9. Storage of Frozen semen straw – Handling of Frozen semen straw
10. & 11. Visit to Frozen semen production stations
12. Basic knowledge about the reproductive organs of cows/she-buffalo
13. & 14. Puberty – Oestrus cycle. – Oestrum – Symptoms of "heat".- stages of oestrus cycle
15. & 16. Standing heat, Identification of Animals in "Heat"- and Management
17. Mid-semester examination
18. Examination of reproductive organs in slaughter house specimen
19. 20, 21. Repeated Rectal examination of reproductive organs in animals going for slaughter
22. & 23. Inserting artificial insemination gun into female reproductive tract (repeated efforts) in animals going for slaughter
24. Artificial insemination technique

25. Visit to nearest artificial insemination center
26. & 27. Non return to heat – Care and management of pregnant animals rearing calving animals
28. & 29. – Calving -Maintaining artificial insemination records
30. & 31.Common reproductive diseases – metritis, repeat breeder- cystic ovary, nutritional deficiencies
32. Role of minerals in productive performance. Calculation of reproductive efficiency
33. Economic traits in relation to reproduction. Age at first service, Age at first calving and inter-calving period
34. Final practical examination

HOR H23 Plantation crops Production Technology 1+1

Theory

Scope and importance of plantation crops- area - production and productivity in Tamil Nadu – Study of cultural operations for the following plantation crops with reference to soil, climate, varieties, propagation, cultural practices- training and pruning – harvesting- yield – processing – grading and packing . **Crops:** Tea, coffee, rubber, cocoa, cashew, coconut, arecanut, oil palm and palmyrah.

Practical

Propagation techniques and nursery management - identification of important varieties, important cultural practices for the plantation crops. Study of post harvest handling and visit to plantation and processing units. **Crops:** Tea, coffee, rubber, cocoa, cashew, coconut, arecanut, oilpalm and palmyrah.

Theory schedule

1. Scope and importance of plantation crops –area - production and productivity.
2. Production technology of Tea - soil, climate, varieties, nursery and planting, training and pruning
3. Water, weed and integrated nutrient management - shade regulation – harvest, processing, grading, packing of Tea
4. Production technology of Coffee - soil, climate, varieties, nursery and planting, training and pruning
5. Water, weed and integrated nutrient management - shade regulation – intercropping, harvest, processing, grading, packing of Coffee
6. Production technology of Rubber - soil, climate, varieties, nursery and planting, training and pruning
7. Water, weed and integrated nutrient management - intercropping, harvest, processing, grading, packing of Rubber
8. Production technology of Cocoa - soil, climate, varieties, nursery and planting, training and pruning
9. **Mid-Semester Examination**
10. Water, weed and integrated nutrient management - shade regulation –harvest, processing, grading, packing of Cocoa
11. Production technology of Cashew - soil, climate, varieties, nursery and planting, training and pruning
12. Water, weed and integrated nutrient management - intercropping, harvest, processing, grading, packing of Cashew
13. Production technology of Coconut – soil, climate, varieties, nursery and planting

14. Water, weed and integrated nutrient management, intercropping, harvest and post harvest handling of coconut

15. Production technology of Arecanut- soil, climate, varieties, nursery and planting, water, weed and integrated nutrient management, intercropping, harvest and post harvest handling

16. Production technology of oil palm - soil, climate, varieties, nursery and planting, water, weed and integrated nutrient management, intercropping, harvest, post harvest handling and processing

17. Production technology of Palmyrah - soil, climate, varieties, nursery, planting, integrated nutrient management – harvest and processing

Practical schedule

1. Identification and description of different plantation crops
2. Nursery practices in tea.
3. Training and pruning in tea.
4. Nursery practices in coffee.
5. Training and pruning in coffee.
6. Nursery practices in rubber.
7. Tapping methods in rubber.
8. Nursery practices, training and pruning in cocoa
9. Mid-Semester examination
10. Cashew – Soft wood grafting high density planting and top working
11. Coconut – Selection of mother palm and seed nut.
12. Coconut- Quality nursery production.
13. Nursery practices in arecanut.
14. Nursery practices and pruning techniques in oilpalm.
15. Tapping methods and postharvest value addition in palmyrah.
16. Visit to commercial plantations and industries
17. Final Practical Examination

References

- Kumar, N. Md. Abdul Khader, P.Rangasamy, and I. Irulappan, 2001. Spices, Plantation Crops, Medicinal and Aromatic Plants, Rajalakshmi Publications, Nagercoil.

HOR H24 Protected cultivation 0+1

Practical

Scope and importance of protected cultivation – growing structures - Study of protected structures – designs and components, orientation and construction of protected structures - covering and roofing materials and ventilation systems - different media –pro tray nursery raising – Sowing - raised bed preparation inside the protected structures / planting –Training, staking and pruning techniques - fertigation and nutrient management – application of growth regulators - Pest and disease management - Protected cultivation techniques for tomato, cucumber and capsicum - Protected cultivation techniques for rose, gerbera, dendrobium orchids and anthurium - .Economics of protected cultivation - Visit to protected cultivation units. **Crops:** Vegetables - **Tomato/ Cucumber / Capsicum** Flowers – **Rose / Gerbera / Dendrobium Orchid / Anthuriums.**

Practical schedule

1. Study of scope and importance of various types of protected structures, designs and components, Orientation and construction of protected structures
2. Study of covering and roofing materials and ventilation systems
3. Study of different media, for protected cultivation
4. Pro tray nursery raising
5. Raised bed preparation inside the protected structures
6. Planting methods in protected structures
7. Training and pruning methods for protected cultivation of vegetables / flowers.
8. **Mid Semester Examination**
9. Fertigation and nutrient managements in protected structures for vegetables / flowers
10. Application of growth regulators in vegetables / flowers
11. Pest and diseases management in protected structure for vegetable / flowers
12. Study of Protected cultivation techniques of tomato / capsicum/ cucumber
13. Study of Protected cultivation techniques of rose / gerbera
14. Study of protected cultivation techniques of anthurium / Dendrobium Orchids
15. Economics of protected cultivation
16. Visit to protected cultivation units
17. **Final practical examination**

References

- Floriculture. Indian Society of Ornamental Horticulture, New Delhi.

HOR H25 Study Tour – II 0+1

Visit to places of commercial cultivation of flower crops, spices and plantation crops (other than coffee and tea) in Tamil Nadu – study of cropping system – varieties – adoption of scientific crop production technology – constraints in production – marketing – economic analysis.

Practical schedule

1. Tamil Nadu Agricultural University, Coimbatore campus.
2. Visit to arecanut area-Forest College & Research Institute, Mettupalayam – Encee Aromatics.
3. Visit to Kallar, Burliar , Coonoor and Ooty.
4. Visit to ARS, Bhavanisagar.
5. Visit to Regional Research Station, Paiyur- Floriculture Units, Hosur, processing units.
6. Visit to Regional Research Station, Vridhachalam – Cashew& VRS, Palur.

HOR H26 Practical training in Hill Horticultural crops 0+3

Practical

Hands on training on temperate horticultural crops at HRS, Kodaikanal. Training in coffee and other subtropical horticultural crops at Horticultural Research Station, Thadiyankudisai or Yercaud – visit to estates, factories, auction centres and blending units. Project preparation for the establishment of estates (14 days).

Practical schedule Hands on training at HRS, Kodaikanal (7 days)

1. Practice in field or jungle clearing, lay out and planting temperate crops
2. Practice in nursery management
3. Practice in application of fertilizers, identification of nutrient deficiencies, foliar feeding of nutrients, mulching and weed management in temperate crops.
4. Practice in training and pruning, rejuvenation & replanting in temperate crops.
5. Identification of pests and diseases and their management temperate crops.
6. Practice in harvesting and handling of temperate crops.
7. Visit to market centers and public parks.
8. Final examination

Coffee training at HRS, Thadiyankudisai /HRS, Yercaud (7 days)

1. Practice in field or jungle clearing, lay out and planting of coffee and shade trees and identification of different varieties.
2. Practice in nursery management, fertilizer application, identification of different nutrient deficiencies and weed control.
3. Practice in shade regulation, training and pruning, identification of pest and diseases and their management.
4. Practice in harvesting, processing and grading.
5. Visit to different coffee estates, curing units, auction centres, coffee boards and markets.
6. Estate management, budgeting, preparation of projects for establishment of coffee estates
7. Hands on training on other hill horticultural crops
8. Final examination.

SST H11 Seed production Technology of Horticultural crops 1+1

Theory

Seed - definition - importance - quality characteristics - generation system – seed multiplication ratio –Seed production - importance - difference between seed and crop production difference between variety and hybrid seed production - Basic principles of seed production - genetic and agronomic principles - Pre and post harvest technologies. Seed production in tropical vegetables -tomato, brinjal and chillies - bhendi and vegetable cowpea, lablab and cluster bean - ashgourd, bittergourd, ribbedgourd, snakegourd and bottlegourd - onion, amaranthus and moringa.Seed production temperate vegetables in cabbage, cauliflower - carrot and beetroot - potato.Seed production in papaya and coconut .Seed production in spices - coriander and fenugreek. Flower crops - marigold, gampherina and cockscomb. Medicinal plants - ashwagandha , periwinkle and senna. Seed certification - phases and procedures - Seed testing – principles and utility of seed testing.Seed Act and Rules and Seed law enforcement - duties and responsibilities of seed inspector.

Practical

Identification and study on seed structure - Practicing pre sowing seed management techniques (priming, coating and pelleting) - Identification of contaminants, rouging and maintenance of field standards in seed production plots - Practicing emasculation and dusting techniques (tomato / brinjal / okra) - Studies on physiological and harvestable maturity - Practicing different seed extraction methods - Practicing seed grading techniques - Practicing pre storage seed treatment and packing materials and maintenance of seed godown - Study on seed certification procedures and field counting - Visit to vegetable seed production plots and processing unit - Visit to Directorate of Seed Certification - Study on Seed sampling, mixing and dividing - Analysis of physical purity and estimation of seed moisture - Conducting germination tests and Seedling evaluation - Practicing Quick viability test - planning seed production.

Lecture Schedule

1. Seed - definition - importance - quality characters and generation system
2. Seed multiplication ratio - importance of seed production - difference between seed and crop production - difference between variety and hybrid seed production
3. Principles of seed production - genetic and agronomic principles- Pre and post harvest technologies
4. Seed production in tomato and brinjal
5. Seed production in chilli and bhendi
6. Seed production in vegetable cowpea, lablab and cluster bean
7. Seed production in gourds (ashgourd, bittergourd, ribbedgourd, snakegourd and bottlegourd)
8. Seed production in onion, amaranthus and moringa
9. **Mid semester examination**
10. Seed production in cabbage and cauliflower carrot and beetroot
11. Seed production in potato
12. Seed production in papaya and coconut
13. Seed production in coriander and fenugreek
14. Seed production in marigold, gampherina and cockscomb
15. Seed production in ashwagandha , periwinkle and senna
16. Seed certification - phases and procedures, principles and utility of seed testing
17. Seed Act and Rules-Seed law enforcement - duties and responsibilities of seed inspector

Practical Schedule

1. Identification and study on seed structure in horticultural crops
2. Practicing pre sowing seed management techniques (priming, coating and pelleting)
3. Identification of contaminants, rouging and maintenance of field standards in vegetables seed production plots
4. Practicing emasculation and dusting techniques (tomato / brinjal /okra)
5. Studies on physiological and harvestable maturity in vegetable crops
6. Practicing different seed extraction methods
7. Practicing seed grading techniques
8. Practicing pre-storage seed treatment, packing materials and maintenance of seed godown
9. Study on seed certification procedures and field counting
10. Visit to vegetable seed production plots and processing unit
11. Visit to Directorate of Seed Certification
12. Study on seed sampling, mixing and dividing
13. Analysis of physical purity and estimation of seed moisture
14. Conducting germination test and seedling evaluation
15. Practicing Quick viability test
16. Planning of seed production
17. **Final examination**

References Text book

- K.Vanangamudi *et al.,* 2010. Vegetable hybrid seed production and management. Agrobios (India), Jodhapur.

FSN H11 Post Harvest Handling and value addition of Horticultural crops 1+1

Theory

Unit – I Introduction to Post harvest technology: Scope and importance of Post harvest technology in horticultural crops. Washing, grading, sorting. Pre cooling-pre treatments-blanching & peeling methods.

Unit – II Post harvest handling methods: Dehydration methods, Canning of fruits and vegetables- Thermal processing - low temperature processing - cold storage - controlled and atmospheric storage - refrigeration truck, ripening chamber, packaging for horticultural crops.

Unit –III Value addition in horticultural crops: Definition - need for value addition. General principles and method for value added products.

Unit –IV Processing of value added products: Processing of fruits - Jam, jelly, squash, RTS and candy. Processing of vegetables - Pickle, chutney, sauce and ketchup. Processing of spices- spice powders and masala mix.

Unit –V Food safety standards : Food safety standards - definition - principles National - Agmark, BIS, FSSAI, HACCP International - Codex, ISO.

Practical

Dehydration methods, Canning of fruits and vegetables- Thermal processing - low temperature processing - cold storage - controlled and atmospheric storage -refrigeration truck, ripening chamber, packaging for horticultural crops. Processing of fruits - Jam, jelly, squash, RTS and candy. Processing of vegetables - Pickle, chutney, sauce and ketchup. Processing of spices- spice powders and masala mix.

Lecture schedule

1. Introduction to Post harvest technology – scope - importance of Post harvest technology in horticultural crops.
2. Grading, sorting, washing – methods.
3. Pre cooling- methods of pre cooling.
4. Pre treatments- blanching and peeling methods.
5. Dehydration- methods – tray, tunnel, drum, spray, freeze, osmotic.
6. Low temperature processing of fruits and vegetables, cold storage, design of cold storage, concept of cold chain.
7. Controlled and modified atmospheric storage- Equipments.
8. **Mid semester examination.**
9. Definition, need, principles of value addition.
10. Preparation of jam, jelly, squash, RTS and candy.
11. Preparation of spice powders.
12. Food safety standards-Definition, principles.
13. National – Agmark, BIS, FSSAI, HACCP.
14. International – ISO, Codex.
15. **Theory Examination.**

Practical Schedule

1. Floor layout of fruit and vegetable processing industry.
2. Equipments and accessories used in processing industry.
3. Performance and evaluation of fruit grader and washer.
4. Performance evaluation of cabinet dryer for fruits and vegetables.
5. Design of cold storage – calculation of cooling load.
6. Preparation of jam, jelly.
7. Preparation of squash, RTS.
8. Preparation of pickle, chutney.
9. Mid semester examination.
10. Preparation of sauce, ketchup.
11. Preparation of candy.
12. Preparation of spice powders.
13. Canning of fruits and vegetables.
14. Drying of fruits and vegetables.
15. Visit to cold storage.
16. Visit to fruit and vegetable processing unit.
17. **Practical examination.**

References

- Sudheer,K.P and Indra,V. (2007) Post Harvest Technology of Horticultural Crops. New India Publishing Co,New Delhi .

AEC H11 Farm Management and Marketing 1+1

Theory

Unit I: Farm Management -Nature and Scope

Farm Management- meaning and scope of Farm Management –relationship with other sciences-Economic principles applied to the organization of farm business-principles of variable proportions-Determination of optimum input and optimum output-Principle of Factor substitution-principle of product substitution -Law of Equi-marginal returns-Opportunity cost principle-Time comparison principle.

Unit II: Farm planning and Budgeting

Types and system of farming-Farm planning-Meaning-Need for farm planning-Types of Farm plans-simple farm plan and whole farm plan-characteristics of a good farm plan-basic steps in farm planning-Farm budgeting –meaning-types of farm budgets –Enterprise budgeting-Partial budgeting and whole farm budgeting.

Unit III: Farm Risk Management

Distinction between risk and uncertainty - sources of risk and uncertainty-production and technical risks- price risk-financial risk-methods of reducing risks.

Unit IV: Agricultural/Horticultural Marketing – Nature and Scope

Concepts and definition of marketing-scope of agricultural marketing-classification of markets-Structure, conduct-performance-market forces-demand and supply-characteristics of agricultural commodities-marketing costs and marketing margins-price spread. Marketed and marketable surplus.

Unit V: Marketing Functions and Institutions

Marketing functions-packaging-transportation- grading and standardization-warehousing-processing-cold storage-marketing agencies and institutions-Cooperative marketing societies-role of regulated markets-NAFED-TANFED-NHB-commodity boards-marketing of agricultural inputs-market information and intelligence-AGMARKNET, DEMIC, DMI etc- usage of market information.

Practical

Visit to farm households-collection of data on cost of cultivation, Determination of optimum input, Determination of optimum combination of products, Computation of cost concepts related to farm management, Farm inventory, Methods of computing depreciation, Farm financial analysis, Preparation of farm plans and budgets. Visit to village shandies, farmers markets, wholesale markets for horticultural crops-visit to cooperative marketing society, regulated markets-marketing channels-computing marketing costs marketing margins-price spread-visit to processing units, AGMARK grading centres-visit to agricultural input trading centres.

Lecture Schedule – Theory

1. Farm Management- meaning and scope of Farm Management –relationship with other sciences

2. Economic principles applied to the organization of farm business-principles of variable proportions- Determination of optimum input and optimum output-
3. Principle of Factor substitution-principle of product substitution.
4. Law of Equi-marginal returns- Opportunity cost principle-Time comparison principle.
5. Types and system of farming-Farm planning-Meaning-Need for farm planning-Types of Farm plans-simple farm plan and whole farm plan-characteristics of a good farm plan.
6. Basic steps in farm planning-Farm budgeting –meaning-types of farm budgets –Enterprise budgeting-Partial budgeting and whole farm budgeting.
7. Distinction between risk and uncertainty - sources of risk and uncertainty.
8. Production and technical risks- price risk-financial risk-methods of reducing risks.
9. **Mid-Semester Examination**
10. Concepts and definition of marketing-scope of agricultural marketing-classification of markets-Structure, conduct-performance.
11. Market forces-demand and supply-characteristics of agricultural commodities.
12. Marketed vs marketable surplus. Marketing costs and marketing margins-price spread.
13. Marketing functions-packaging-transportation- grading
14. Standardization-warehousing-processing-cold storage
15. Marketing agencies and institutions-cooperative marketing societies-role of regulated markets
16. NAFED-TANFED-NHB-commodity boards- marketing of agricultural inputs
17. Market information and intelligence-AGMARKNET, DEMIC, DMI etc- usage of market information.

Practical Schedule

1. Visit to a farm (government/ private/ corporate) to study the layout and organization
2. Visit to farm households-collection of data on cost of cultivation
3. Cost concepts -computation
4. Depreciation-methods of computing depreciation
5. Farm records and accounts – production records and financial records
6. Farm inventory analysis – examination and valuation of assets
7. Preparation of farm plans and budgets
8. Farm financial analysis
9. Preparation of interview schedules for collection of data
10. Farm visit to collect information on marketing practices and marketing problems
11. Estimation of marketed and marketable surplus, price spread for horticultural crops.
12. Visit to village shandies/ vegetable market/ farmers markets
13. Visit to wholesale markets/commission mundies for horticultural crops
14. Visit to cooperative marketing society/regulated markets
15. Visit to farm input dealers
16. Visit to AGMARK laboratories/ grading centres/cold storage
17. **Practical Examination**

References

- S.S Johl, J.R.Kapur,2006, Fundamentals of Farm Business Management:, Kalyani Publishers New Delhi.
- S.S Acharya and N.L.Agarwal, 2004, Agricultural Marketing in India, Oxford & IBH Publishing Company, New Delhi.

AEX H11 Fundamentals of Extension Education 1+1

Theory

Agricultural Extension – meaning, definition, scope, principles. Teaching Learning Process. Communication – meaning, definition, elements and their characteristics, types, models and barriers in communication. Diffusion – meaning, definition and elements. Adoption – meaning, definition, stages, adopter categories and their characteristics. Extension methods – definition, classification - individual contact, group contact and mass contact methods. Participatory Rural Appraisal techniques. Audio-Visual aids – definition, advantages, classification, choice, criteria for selection. Farm Journalism – definition, basic concepts, writing for media.Information and Communication Technology (ICT) – computer networks, internet, video conferencing, agriportals, Kisan Call Centre, mobile phone. Photography – basic concepts, advancements.

Practical

Learning the activities of State Department of Agriculture and Horticulture – ATMA – NGO – Agri Clinic – SHGs. Learning the activities of TNAU KVKs. Learning the activities of Directorate of ODL. Studying the adoption pattern of farm technologies. Practicing Participatory Rural Appraisal techniques. Preparation and presentation of audio visual aids. Handling of LCD projection system. Studying the activities of Community Radio Station, All India Radio and Newspaper office. Writing script for newspaper, radio and television. Learning skills in photography.

Lecture schedule

1. Agricultural Extension – meaning, definition, scope of Agricultural Extension and principles of extension.
2. Teaching Learning Process – definition and elements.
3. Communication - meaning, definition, elements and their characteristics.
4. Communication - types, models and barriers of communication.
5. Diffusion - meaning, definition and elements.
6. Adoption - meaning, definition, stages, adopter categories and their characteristics.
7. Extension methods – definition and classification.
8. Individual contact methods - farm and home visit, farmer's call, personal letter, adaptive minikit trial, farm clinic.
9. Mid Semester Examination
10. Group contact methods – method demonstration, result demonstration, meeting, small group training, field day, study tour, lecture, debate, workshop, seminar, forum, conference, symposium, panel, brain storming, buzz session, role playing and simulation techniques.
11. Mass contact methods – farm publications, mass meeting, campaign, exhibition, newspaper, radio, television.
12. Participatory Rural Appraisal techniques – transect walk, resource mapping, time line, seasonal calendar, venn diagram, wealth ranking, matrix ranking
13. Audio visual aids - definition, advantages and classification.
14. Choice of audio visual aids and criteria for selection of audio visual aids.
15. Farm Journalism – definition, basic concepts, ABC of Journalism, writing for media.
16. Information and Communication Technology - computer networks, internet, video conferencing, agri portals, Kisan Call Centre, mobile phone.
17. Photography – basic concepts, types of camera, advancements in photography.

Practical schedule

1. Visit to office of Joint Director of Agriculture or Joint Director of Horticulture or Assistant Director of Agriculture or Assistant Director of Horticulture to study their activities and extension methods followed.
2. Participating in village meetings/demonstrations in villages and interacting with extension officialsand farmers.
3. Study of ongoing agricultural/horticultural/rural development programmes in villages by interacting with farmers.
4. Visit to ATMA project areas to get exposure on the schemes implemented by interacting with farmers.
5. Interacting with NGO / Agri clinic / Self Help Group (SHG) and learning about their activities.
6. Visit to TNAU - KVK to study about their activities and extension programmes.
7. Studying the distance learning efforts of Directorate of ODL
8. Studying the adoption pattern of farm technologies – preparation of interview schedule.
9. Studying the adoption pattern of farm technologies – visit to village and interviewing farmers – data analysis – preparation of report.
10. Practicing Participatory Rural Appraisal techniques in villages.
11. Preparation and presentation of posters, charts, graphs, circular letter, folders, leaflets and bulletins.
12. Preparation of power point presentations and practice in use of LCD projection system.
13. Visit to Community Radio Station/All India Radio Station and studying their activities.
14. Visit to nearby newspaper office and studying its activities.
15. Practicing script writing for radio, television and newspaper.
16. Learning skills in photography and practicing.
17. **Final Practical Examination.**

References

- Adivi Reddy A.2001. Extension Education. Sree Laxmi Press, Bapatla, A.P.
- Ray, G.L. 2004. Extension Communication and Management. Kalyani Publishers, New Delhi.