B.Sc (HORTICULTURE) SEMESTER – I
PAPER – I: Fundamentals of Horticulture
Theory

Introduction and Principles of Horticulture:

Unit - I
1.1 Definition of Horticulture.
1.2 Importance of horticulture in terms of economy, production, employment, generation, environmental protection and human resource development.
1.3 Scope for horticulture in India. Nutritive value of horticultural crops.
1.4 Divisions of horticulture with suitable examples and their importance.
1.5 Classification of horticulture crops based on soil and climatic requirements. Fruit and Vegetable zones of India and Andhra Pradesh.

Unit – II
2.1 Definition of a nursery.
2.2 Different types of nursery beds – flat beds, raised beds and sunken beds, their merits and demerits.
2.3 Different nursery techniques and their management.
2.4 Vegetable gardens, nutrition and kitchen garden, truck garden, Vegetable forcing, market gardens and roof gardens.
2.5 Different steps in planning and layout establishment and management of orchards.
2.6 Different systems of planting orchards - square, rectangle, quincunx, hexagonal and contour systems of planting – their merits and demerits.
2.7 Calculation of planting densities in different systems of planting.

Unit – III
3.1 Pruning: Definition, objectives.
3.2 Principles and methods of pruning of fruit crops.
3.3 Training: Definition, objectives.
3.4 Principles and methods of training of fruit crops: Open centre, Closed centre and Modified leader systems, their merits and demerits.
3.5 Bearing habits in horticultural crops.
3.6 Irrigation: definition, different methods of irrigation followed in horticultural crops, their merits and demerits.
3.7 Manures and fertilizers: Definition, different methods of application of manures and fertilizers to horticultural crops.
Preharvesting and Propagation of Horticultural Plants:

Unit – IV

4.1 Cropping systems: Inter cropping and multi – tier cropping, their merits and demerits with suitable examples.

4.2 Practical uses of growth regulators in horticulture.

4.3 Fruitfulness and unfruitfulness: Definitions, Factors influencing the fruitfulness and unfruitfulness with suitable examples.

4.4 Rejuvenation of old orchards, Importance of rejuvenation: Top working and Frame working.

4.5 Maturity: Definition, Different methods to judge maturity in horticultural crops.

Unit – V

5.1 Propagation: Definition, Methods, Sexual and asexual, advantages and disadvantages of each method, Asexual method of propagation, propagation by division and separation.

5.2 Propagation by cuttings: Definition of cutting, Different methods of cuttings, semi hard wood, soft wood and herbaceous stem cuttings, examples for each type; Leaf cuttings.

5.3 Plant propagation by layering: Definition of layering and layer; Types of layering: Ground layering – Tip layering, Simple layering, Trench layering, Mound or Stool layering and Compound or Serpentine layering, examples for each type; Air layering examples.

5.4 Plant propagation by grafting: Definition; methods of grafting: Attached scion methods of grafting, Simple inarching or approach grafting; Detached scion methods of grafting: Pre-curing of scion, Side grafting methods: Veneer grafting, Apical grafting methods, Epicotyle grafting, Soft wood grafting, Double working, Top working.

5.5 Plant propagation by budding: Definition of budding; Methods of budding: T- budding and Inverted T- budding, patch budding and ring budding.

Practicals

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

Reference Books:
Acharya Nagarjuna University

B.Sc (Horticulture) Semester II

Paper II: Postharvest Technology of Horticultural Crops

Theory

Unit I
Importance of Postharvest handling.
Maturity and maturity indices of Horticultural crops.
Harvesting methods of Horticultural crops.
Factors responsible for maturity, ripening and deterioration of Horticultural crops.
Preharvest factors: Selection of varieties, Cultural operations, Preharvest treatment
Maturity and Harvesting.

Unit II
Postharvest factors: Curing, degreening, precooling, washing and drying, storing
and grading, disinfestations, Postharvest treatments and Waxing.
Physiological and Biochemical changes during ripening.
Methods used for hastening and delaying ripening: Chemicals that hasten ripening
and chemicals that delay ripening.
Ethylene in Postharvest technology.

Unit III
Respiration and transpiration in relation to harvesting, packing, transportation and
storage.
Nature and causes of deterioration: a) Primary causes of losses– i) Mechanical
Secondary causes of losses.
Impact of postharvest losses.
Technologies for minimizing losses.
Methods of precooling, grading, packaging, storage and transport of horticultural crops.

**Unit IV**
Principles and method of preservation: Preservation by asepsis, high temperature, low temperature, chemicals, drying, filtration, carbonation, sugar, salt, fermentation, acids, oil and spices, antibiotics, irradiation.
Canning and bottling of fruits and vegetables.
Causes for spoilage of canned foods.
Unfermented fruit beverages: Preparation and preservation of unfermented fruit beverages—Juices, RTS, Nectar, Cordial, Squash, Syrup, Fruit juice concentrate, Crush.

**Unit V**
Fermented fruit beverage: Different types of wine preparation.
Preservation by sugar: Candies, Crystallized fruits, Preservation, procedure for preparation.
Preservation by salt: Pickles.
Food laws.

**Practicals**

1. Visit to a commercial nurseries in the locality and adjoining areas.
2. Microscopic studies on foliar diseases of horticultural crops.
3. Practice in judging the maturity indices of fruits and vegetables.
4. Preparation of juices and squashes.
5. Preparation of jam and jelly.
6. Preparation of ketchup and sauce.
7. Preparation of pickles.

**Reference Books:**

8 Small–scale Postharvest Technology, Kitinoja, L& Kader, A.A. 2002. Research and Information Center, University of California , Davis.

ACHARYA NAGARJUNA UNIVERSITY
B.Sc (Horticulture)
B.Sc., SEMESTER – III

<table>
<thead>
<tr>
<th>Sno</th>
<th>Course</th>
<th>Total Marks</th>
<th>Mid Sem Exam</th>
<th>Sem End Exam</th>
<th>Teaching Hours</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>First Language</td>
<td>100</td>
<td>25</td>
<td>75</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>English</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Second Language</td>
<td>100</td>
<td>25</td>
<td>75</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>(Tel/Hin/Urdu/Sans…)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Foundation Course - 5</td>
<td>50</td>
<td>0</td>
<td>50</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Entrepreneurship</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Foundation course -2B</td>
<td>50</td>
<td>0</td>
<td>50</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Communication &amp; Soft Skills -2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>DSC 1 C (Group Sub- 1)</td>
<td>100</td>
<td>25</td>
<td>75</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>6</td>
<td>DSC 1 C Practical</td>
<td>50</td>
<td>0</td>
<td>50</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>7</td>
<td>DSC 2 C (Group Sub- 2)</td>
<td>100</td>
<td>25</td>
<td>75</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>8</td>
<td>DSC 2 C Practical</td>
<td>50</td>
<td>0</td>
<td>50</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>9</td>
<td>DSC 3 C (Group Sub- 3)</td>
<td>100</td>
<td>25</td>
<td>75</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>10</td>
<td>DSC 3 C Practical</td>
<td>50</td>
<td>0</td>
<td>50</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>750</td>
<td>-</td>
<td>-</td>
<td>30</td>
<td>25</td>
</tr>
</tbody>
</table>
ACHARYA NAGARJUNA UNIVERSITY
B.Sc (Horticulture)
B.Sc (HORTICULTURE ) SEMESTER – III
Paper III – PRODUCTION TECHNOLOGY OF FRUIT CROPS
Theory syllabus

Unit I: Introduction to Fruit Crops
Importance of fruit growing in India and Andhra Pradesh.
Nutritive value of fruits.
Area and production of India and Andhra Pradesh.
Export and import potential of fruits in India.
Constraints in fruit production and remedies to overcome them.

Unit II: Cultivation practices of tropical fruit crops
Origin, history, distribution, area and production, uses and composition, varieties,
soil and climatic requirements, propagation, planting, training and pruning,
manuring and fertilizer application, irrigation, intercropping, harvesting and yield,
diseases and pests of the following tropical fruit crops:
Mango
Banana
Citrus
Guava
Papaya

Unit III: Cultivation practices of sub-tropical and temperate fruit crops
Origin, history, distribution, area and production, uses and composition, varieties,
soil and climatic requirements, propagation, planting, training and pruning,
manuring and fertilizer application, irrigation, intercropping, harvesting and yield,
diseases and pests of the following sub-tropical and temperate fruit crops:
Grapes
Pomegranate
Apple
Pear

Cultivation practices of arid and minor fruit crops:
Unit IV
Origin, history, distribution, area and production, uses and composition, varieties,
soil and climatic requirements, propagation, planting, training and pruning,
manuring and fertilizer application, irrigation, inter cropping, harvesting and yield,
diseases and pests of the following arid fruit crops:
Amla
Ber
Tamarind
Unit V
Origin, history, distribution, area and production, uses and composition, varieties, soil and climatic requirements, propagation, planting, training and pruning, manuring and fertilizer application, irrigation, inter cropping, harvesting and yield, diseases and pests of the following minor fruit crops:
Jamun
Bael
Wood apple

Practicals
1 Study of varieties of Mango and Banana.
2 Study of varieties of Grape and Citrus.
3 Study of varieties of Papaya, Sopata and Guava.
4 Manure and fertilizer application including biofertilizers in different fruit crops (Methods of application, calculation of the required quantity of manure and fertilizers based on the nutrient content).
5 Study of varieties of Pomegranate, Custard apple and Ber
6 Study of varieties of Apple.
7 Study of varieties of minor fruit crops
8 Use of growth regulators in fruit crops.
9 Identification and collection of important pests in fruit crops.
10 Identification and collection of important diseases in fruit crops and Herbarium preparation.
11 Visit to a fruit market/commercial orchids

Reference Books:
ACHARYA NAGARJUNA UNIVERSITY
B.Sc (Horticulture)
B.Sc., SEMESTER – IV

<table>
<thead>
<tr>
<th>Sno</th>
<th>Course</th>
<th>Total Marks</th>
<th>Mid Sem Exam*</th>
<th>Sem End Exam</th>
<th>Teaching Hours**</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Foundation Course – 2C* Communication &amp; Soft Skills -3</td>
<td>50</td>
<td>0</td>
<td>50</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>2</td>
<td>Foundation Course – 6* Analytical Skills</td>
<td>50</td>
<td>0</td>
<td>50</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>Foundation Course - 7 ** CE (Citizenship Education)</td>
<td>50</td>
<td>0</td>
<td>50</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>4</td>
<td>Foundation course – 4B ICT – 2 (Information &amp; Communication Technol)</td>
<td>50</td>
<td>0</td>
<td>50</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>5</td>
<td>DSC 1 D (Group Sub- 1)</td>
<td>100</td>
<td>25</td>
<td>75</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>6</td>
<td>DSC 1 D Lab Practical</td>
<td>50</td>
<td>0</td>
<td>50</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>7</td>
<td>DSC 2 D (Group Sub- 2)</td>
<td>100</td>
<td>25</td>
<td>75</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>8</td>
<td>DSC 2 D Lab Practical</td>
<td>50</td>
<td>0</td>
<td>50</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>9</td>
<td>DSC 3 D (Group Sub- 3)</td>
<td>100</td>
<td>25</td>
<td>75</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>10</td>
<td>DSC 3 D Lab Practical</td>
<td>50</td>
<td>0</td>
<td>50</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>750</td>
<td>-</td>
<td>-</td>
<td>30</td>
<td>25</td>
</tr>
</tbody>
</table>

*To be taught by English Teachers (and partly by Maths/Stat Teachers)
** To be taught by Telugu Teachers
ACHARYA NAGARJUNA UNIVERSITY
B.Sc (Horticulture)
B.Sc (HORTICULTURE) SEMESTER – IV
Paper IV – PRODUCTION TECHNOLOGY OF VEGETABLE CROPS
Theory syllabus

Unit I
Olericulture definition.
Importance of vegetables in human nutrition and national economy.
Types of vegetable gardens.
Classification of vegetables based on botany, plant part used as vegetables, seasons of growing and methods of culture.

Unit II
Origin, Taxonomy, importance, growth habits (wherever applicable), varieties, climate and soil, nursery raising, transplanting, spacing, manuring, irrigation, intercultivation, harvesting, different stages of maturity, physiological disorders, causes and control and yield of the following tropical vegetables:
- Tomato,
- Brinjal.
- Chilli,
- Okra.

Gourds: Bottle gourd, Snake gourd, Bitter gourd and Ash gourd.

Unit III:
Importance, botany, climate and soil, varieties, cultivation, pruning and training, manuring and fertilization, intercultural operations, irrigation, harvesting and postharvest management:
- Water melon and Musk melon.
- Onion.

Unit IV
Importance, Botany, varieties, climate and soil, seeds and sowing, manuring, irrigation, intercultural operations, harvesting and yield of following crops:
Tuber crops: Colocasia, Elephant foot yam and Dioscorea.
Root tubers: Sweet Potato, Tapioca.
Root crops: Carrot, Radish, Turnip and Beet root.

Unit V
Importance, botany, climate and soil, sowing, manuring, irrigation, intercultural operations, harvesting and postharvest management:
Cole Crops: Cabbage, Cauliflower, Knoll-knol.
Leafy vegetables: Amaranthus, Palak, Gogu.
Perennial vegetables: Coccinia, Curry leaf and Drumstick.
Practicals
1. Nursery bed preparation and management/ Preparation of field for sowing/transplanting.
2. Pre sowing seed treatments in vegetable crops (Cold water/ Hot water/ Acid/ Chilling)
3. Identification and description of tomato, brinjal and chilli varieties.
4. Identification and description of okra, gourds and melon varieties.
5. Visit to farmer’s field.
6. Visit to a Vegetable Research Station.
8. Identification and Description of beans and peas varieties.
10. Identification and description of leafy vegetable and perennial vegetable varieties.
11. Preparation of vegetables for marketing (cleaning, trimming, washing, sorting, grading, stocking and bundling)
12. Calculation of cost of cultivation for important vegetable crops and project preparation of commercial cultivation.
13. Study of irrigation (furrow/ sprinkler/ drip) methods in vegetable crops.
15. Preparation of seed herbaria and herbaria of vegetable crops.

Reference Books:

B Sc., SEMESTER – V

<table>
<thead>
<tr>
<th>Sno</th>
<th>Course</th>
<th>Total Marks</th>
<th>Mid Sem Exam</th>
<th>Sem End Exam</th>
<th>Teaching Hours</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Skill Development Course – 1 (University's Choice)</td>
<td>50</td>
<td>0</td>
<td>50</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>2</td>
<td>DSC 1 E (Group Sub- 1)</td>
<td>100</td>
<td>25</td>
<td>75</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Course Description</td>
<td>Credits (L-T-P)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>----------------------------------------</td>
<td>----------------</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>DSC 1 E Lab Practical</td>
<td>50 0</td>
<td>50</td>
<td>2</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>DSC 2 E (Group Sub- 2)</td>
<td>100 25</td>
<td>75</td>
<td>4</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>DSC 2 E Lab Practical</td>
<td>50 0</td>
<td>50</td>
<td>2</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>DSC 3 E (Group Sub- 3)</td>
<td>100 25</td>
<td>75</td>
<td>4</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>DSC 3 E Lab Practical</td>
<td>50 0</td>
<td>50</td>
<td>2</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Elective -1*: DSC 1 F / Inter-disp</td>
<td>100 25</td>
<td>75</td>
<td>4</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Elective-1 Lab Practical</td>
<td>50 0</td>
<td>50</td>
<td>2</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Elective*-2: DSC 2 F / Inter-disp</td>
<td>100 25</td>
<td>75</td>
<td>4</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Elective-2 Lab Practical</td>
<td>50 0</td>
<td>50</td>
<td>2</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Elective*-3: DSC 3 F / Inter-disp</td>
<td>100 25</td>
<td>75</td>
<td>4</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Elective-3 Lab Practical</td>
<td>50 0</td>
<td>50</td>
<td>2</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>Total</td>
<td>950 -</td>
<td>-</td>
<td>38</td>
<td>32</td>
<td></td>
</tr>
</tbody>
</table>

6th (F) paper of each of the domain specific subjects (2nd paper of semester V) may preferably be an Elective. More than one Elective may be offered giving choice to students. The Electives may be of Domain (applied/specialization) or Inter-disciplinary in nature. The number of Electives may be decided (along with the syllabus) by the University concerned keeping the feasibility of conduct of University examinations in view.

B.Sc (HORTICULTURE) SEMESTER – V

Paper V – FLORICULTURE

Theory syllabus

Unit I

Scope and importance of commercial floriculture in India.
Cultivation practices: Origin, history, area, production, economic importance, soil and climate, varieties, propagation, nursery raising, transplanting, manuring, irrigation, aftercare, plant protection, use of growth regulators, special horticultural practices, harvesting, postharvest handling, grading, packing, storage, transportation and marketing of the following flowering crops:
a) Rose b) Jasmine c) Tuberose d) Gladiolus e) Carnation

Unit II
Cultivation practices: Origin, history, area, production, economic importance, soil and climate, varieties, propagation, nursery raising, transplanting, manuring, irrigation, aftercare, plant protection, use of growth regulators, special horticultural practices, harvesting, postharvest handling, grading, packing, storage, transportation and marketing of the following flowering crops:

a) Chrysanthemum b) Aster c) Marigold d) Crossandra e) Gaillardia
f) Gerbera g) Dahlia

Ornamental and Landscape Gardening:
Unit III
Principles of landscape gardening, Importance and scope of landscape gardening, History of landscape gardening, Art principles, Important terms of landscape gardening, Garden adornments.
Garden features:
Wall, Fencing, Steps, Garden, Garden drives and paths, Hedges, Edges, Arches, Pergola, Lawn, Carpet bedding, Flower beds, Shrubbery, Borders, Rockery, Water gardens, Bonsai, Topiary.

Unit IV
Garden types and styles:
a) Garden types: Indoor garden, Outdoor garden.
b) Garden styles: Formal gardens, Informal gardens, Freestyle gardens.
Special type of Gardens: Terrace garden, Rock garden, Sunken garden.

Unit V
Orchid Biology.
Multiplication of orchids.
Postharvest handling of orchid flowers.

Practicals
1. Identification and description of rose, jasmine and chrysanthemum varieties.
2. Identification and description of marigold, crossandra and tuberose varieties.
3. Visit to commercial nursery and Green house.
4. Calculation of cost cultivation for important flower crops and project preparation of commercial cultivation.
5. Identification of physiological, nutritional disorders and their corrections in flower crops.
6. Study of special horticultural practices (pinching, stopping, disbudding, dissheeting).
7. Study of flower arrangements/preparation media for extending vase life of flowers.
8. Preparation of herbaria and seed samples of ornamental crops.
10. Layout of home gardens/formal gardens and informal gardens.
11. Study of topiary in gardens.
12. Planting and maintenance of lawn/hedges and edges.

Reference Books:

B.Sc (HORTICULTURE) SEMESTER – V
Paper VI(A) – PRODUCTION TECHNOLOGY OF SPICES AND CONDIMENTS
(Selective)
Theory syllabus

Unit I
Introduction, history of spices, definition of spices and condiments, important spice crops of India.
Classification of spices, role of spices in human nutrition, industry exports and imports of spices in improving the National Economy.
Role of spices board; Pepper Export Promotion Council; Institutions and Research Centers in R&D.
Black pepper: Botany, Plant parts used, origin and distribution, introduction, Varieties, climate, soil, propagation, planting, cultivation, shade regulation, training and pruning of vine, manuring, irrigation, intercultural operations, harvesting, yield and processing.

Unit II
Cardamom: Plant parts used origin and distribution, introduction, Botany, varieties, climate, soil, preparation of land, propagation, planting, shade and manuring, irrigation, cropping, harvesting, yield and processing.
Clove: Botany, plant parts used, origin and distribution, introduction, varieties, climate, soil, preparation of land, propagation by seed, raising of the nursery planting, weeding, staking, manuring, irrigation, pruning, harvesting, curing and processing.

Unit III
Nutmeg: Importance. Botany, area, production, uses, varieties, export value, propagation, nursery techniques, soil and climate, planting, cropping system like mixed cropping, manuring, weeding, constraints like sex determination and improvement in cultivation, harvesting.

Cinnamon: Botany, varieties, export potential, soil and climate, propagation through seed, cutting, tree stumps; planting, weeding, manuring, harvesting, postharvest technology: cutting and peeling, preparation of quills, drying, grading, packing and storage, value added products.

Vanilla: Importance, Botany, area and production, export value, uses, varieties, constraints of production, propagation by cuttings, soil and climate, land preparation, staking, planting, manuring, flowering and pollination, hand pollination, harvesting, curing and processing and types of vanilla like Mexican vanilla, Bourbon vanilla, Indonesian vanilla, value added products like vanilla pods, vanilla essence, vanilla sugar, vanilla oleoresins, grading, packing, storage.

Unit IV
Cumin: Importance. Botany, varieties, climate and soil, cultivation, irrigation, manuring and fertilization, harvesting and postharvest management.

Turmeric: Introduction, scope and importance, Botany, area and production, use, export potential, varieties, soil and climate, propagation, preservation of seed rhizome, selection of land and preparation, methods of cultivation like bed system, ridge and furrow system, planting, seasons, seed rate, spacing, mulching, irrigation, nutrient management, weeding and intercropping, shade provision, cropping system like intercropping, rotations, harvesting, indices, yield, postharvest technology.

Unit V
Ginger: Botany, origin, plant parts used introduction, varieties, propagation, climate, soil, preparation of land, planting season, seed rate, spacing, mulching, irrigation, manuring, intercultural operation, harvesting and processing, preservation of seed material.

Seed spices and others: Botany, plant parts used origin and distribution, varieties, climate, soil, preparation of land, seasons, seed and sowing, irrigation, manuring, intercultivation, harvesting and yield of the following crops:

a) Coriander  b) Fenugreek  c) Dill d) Rosemary.
Practicals

13. Identification of spices and condiments.
15. Identification of varieties of spices and condiments.
16. Methods of extraction of essential oils and oleoresins in spices and condiments.
17. Visits to commercial spice gardens & plantations and processing units.
18. Visit to essential oil extraction units.

Reference Books:

B.Sc (HORTICULTURE ) SEMESTER – V
Paper VI(B) – Extension Methods in Horticulture (Elective)
Theory

1. Communication – definition, models of communication process – Aristotle, Shannon-Weaver, Berlo, Schramm, J.P. Leagans, Rogers and Shoemaker, Litterer, Westley-Macleans and extension communication system; functions of communication
2. Elements of communication and their characteristics – communicator, message, channel, treatment, audience, audience response and feedback
3. Types of communication – oral, written and non-verbal; non-verbal communication – types and functions – barriers / problems in communication – Some concepts relating to communication – frame of reference, perception, communication fidelity, communication gap, time lag in communication, empathy, heterophily and homophily
4. Extension teaching method – definition – functions and classification according to use and form – strong and weak points of individual – group and mass contact methods – individual contact methods: farm and home visit – meaning – purpose – procedure – advantages and limitations
between method demonstration and result demonstration; group discussion — meaning — purposes — procedure — roles of chairman, members and expert — advantages and limitations,

7. Group contact methods — field trips and field days — meaning — objectives — procedure — advantages and limitations — Farm Field School (FFS) — meaning — concept — objectives and steps in organizing FFS

8. Small group discussion techniques — lecture / extension talk — meaning — characteristics — advantages and limitations — difference between extension talk and lecture — symposium — panel — debate — forum — buzz group — workshop — brain storming — seminar — conference — meaning


10. Radio — meaning — purposes — advantages and limitations; rural and farm broadcasting — farm and home units — objectives; radio rural forums — farm school on All India Radio (AIR) — Meaning and procedure and agricultural programmes; Television — meaning — objectives — agricultural programmes — advantages and limitations

11. Information sources — internet — meaning — purposes — benefits and limitations — cyber cafes / kiosks — meaning — video and teleconferences — meaning — components — advantages — cyber extension — meaning — features — five successful models — advantages — factors influencing selection and combination of extension teaching methods

12. Call centres — Parishkaram (Farmers Call Centre) in Andhra Pradesh and Kisan Call Centers — meaning — objectives — operational mechanism (Three levels) — agri-clinics — meaning — objectives — eligibility — training — loan assistance and advantages — agricultural journalism — meaning — scope — importance — characteristics of news — factors determining the news value — types of news and sources of news

13. Diffusion and adoption of innovations — adoption — diffusion — adoption process and innovation — meaning — models of adoption process — five and seven stage models — attributes of innovation — relative advantage, compatibility, complexity, trialability, observability and predictability

14. Innovation — decision process — meaning and stages (knowledge, persuasion, decision, implementation and confirmation); concepts dissonance and rejection — active rejection and passive rejection — discontinuance — replacement and disenchantment discontinuance, over adoption, rate of adoption and innovativeness — adopter categories and their characteristics.

15. Factors influencing adoption process — social, personal and situational; capacity building of extension personnel and farmers — training — meaning — types of training — pre-service training, in service, orientation, induction training, refresher training and training for professional qualification — training to farmers — time, duration and venue
16. Farmers’ Training Centre (FTC) – objectives and trainings organized; Krishi Vigyan Kendra (KVK) – mandate; District Agricultural Advisory and Transfer of Technology Centre (DAATTC) – objectives

Practicals

Simulated exercises on communication and distortion communication
Organizing a group discussion
Conducting method demonstrations / skill teaching
Visit to Krishi Vigyan Kendra (KVK) / Farmers’ Training Centre (FTC)
Visit to District Agro-horticulture Advisory and Transfer of Technology Centre (DAATTC)
Planning and writing a script for radio and television
Audio-Visual aids – importance and classification, planning, presentation and evaluation of visual aids
Planning and preparation of charts, posters, OHP transparencies, power point slides etc.
Planning and preparation of information materials – leaflet, folder and pamphlet
Planning and preparation of news stories and success stories
Handling of video camera

References


### B.Sc., Semester – VI

<table>
<thead>
<tr>
<th>Sno</th>
<th>Course</th>
<th>Total Marks</th>
<th>Mid Sem Exam</th>
<th>Sem End Exam</th>
<th>Teaching Hours</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Skill Development Course – 2 (University’s Choice)</td>
<td>50</td>
<td>0</td>
<td>50</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>2</td>
<td>DSC 1 G (Group Sub- 1)</td>
<td>100</td>
<td>25</td>
<td>75</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>3</td>
<td>DSC 1 G Lab Practical</td>
<td>50</td>
<td>0</td>
<td>50</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Course</td>
<td>Credits</td>
<td>Theory</td>
<td>Practice</td>
<td></td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>---------------------------------------------</td>
<td>---------</td>
<td>--------</td>
<td>----------</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>4</td>
<td>DSC 2 G (Group Sub. 2)</td>
<td>100</td>
<td>25</td>
<td>75</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>5</td>
<td>DSC 2 G Lab Practical</td>
<td>50</td>
<td>0</td>
<td>50</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>6</td>
<td>DSC 3 G (Group Sub. 3)</td>
<td>100</td>
<td>25</td>
<td>75</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>7</td>
<td>DSC 3 G Lab Practical</td>
<td>50</td>
<td>0</td>
<td>50</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>8</td>
<td>Elective -4*: DSC 1 H / Inter-disp/Gen Elec</td>
<td>100</td>
<td>25</td>
<td>75</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>9</td>
<td>Elective-4 Lab Practical</td>
<td>50</td>
<td>0</td>
<td>50</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>10</td>
<td>Elective-5*: DSC 2 H / Inter-disp/Gen Elec</td>
<td>100</td>
<td>25</td>
<td>75</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>11</td>
<td>Elective-5 Lab Practical</td>
<td>50</td>
<td>0</td>
<td>50</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>12</td>
<td>Elective-6*: DSC 3 H / Inter-disp/Gen Elec</td>
<td>100</td>
<td>25</td>
<td>75</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>13</td>
<td>Elective-3 Lab Practical</td>
<td>50</td>
<td>0</td>
<td>50</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>14</td>
<td>Total</td>
<td>950</td>
<td>-</td>
<td>-</td>
<td>38</td>
<td>32</td>
</tr>
</tbody>
</table>

*8th (H) paper of each of the domain specific subjects (2nd paper of semester VI) may preferably be an Elective. More than one Elective may be offered giving choice to students. The Electives may be of Domain (applied/specialization) or Inter-disciplinary or General in nature. The number of Electives may be decided (along with the syllabus) by the University concerned keeping the feasibility of conduct of University examinations in view.

Total Credits for a B.Sc. Course: 164

B.Sc (HORTICULTURE) SEMESTER – VI

Paper VII – PLANTATION CROPS AND WEED MANAGEMENT

Theory syllabus

Unit I
Introduction and importance in Indian economy, export and import potential, Industrial importance.

Cashew nut: Origin, introduction, importance, botany, climate, soil, varieties and propagation, preparation of land, planting, irrigation, manuring, intercultivation, intercropping, training and pruning, cropping, physiological disorders, harvesting, yield, processing.

Cacao: Origin, importance, botany, varieties, forester. Criollo and other types, climate, soil, propagation, preparation of land, planting, irrigation, weeding, mulching, pruning, intercropping, cover cropping, manuring, physiological disorder, harvesting, yield, processing, uses.
Unit II
*Oil palm:* Origin, economic part, importance, botany, varieties, climate, soil, propagation and planting, irrigation, intercultivation, physiological disorder, harvesting, yield, processing.

*Areca nut:* Origin, economic part, importance, botany, varieties, climate, soil, propagation and planting, irrigation, intercultivation, physiological disorder, harvesting, yield, processing.

Unit III
*Coffee:* Origin, introduction, importance, botany, Arabica and Robusta coffee, climate and soil, propagation, preparation of land, planting, provision of shade, training and pruning, manuring, irrigation, intercropping, soil management, mulching, weed control, cropping, physiological disorder, processing.

*Tea:* Introduction, origin and distribution, area and production, soil, climate, varieties, vegetative propagation, source of propagation materials, method of planting, planting season, mulching, weeding, shade and its management, types of branching, rejuvenation pruning, manuring, application of zinc sulphate, irrigation, leaf plucking, yield of leaves, manufacturing tea, Oolong tea, grading, packing.

*Coconut:* Importance, botany, climate and soil, varieties, propagation, cultivation, manuring and fertilization, irrigation, harvesting and postharvest management.

Weed Management:

Unit IV
Introduction of weed management, harmful and beneficial effects, classification of weeds, propagation and dissemination.

Weed biology and ecology, crop and weed association.

Concepts of weed prevention, control and eradication.

Methods of weed control: physical, cultural, chemical and biological methods.

Unit V
Integrated weed management

*Herbicides: Herbicide classification, Advantages and limitations.

Herbicide formulations, methods of applications, compatibility of herbicides with other agrochemicals.

Practicals

19. Description and identification of coconut, & oil palm varieties/hybrids.
20. Description and identification of cacao, cashew nut varieties/ hybrids.
21. Visit to commercial plantations and processing centers.
22. Identification of weeds; survey of weeds in plantation crop and other corps fields
23. Preparation of herbarium of weeds.
24. Calculations in weed control efficient and weed index.
25. Demonstration of methods of herbicide application.

Reference Books:
1. Production Technology of Spices and pPlantation Crops, Shanmugavelu, K.G.
   Kumar, N. and Peter, K.V. 2005. Agrosis, Jodhpur.
2. Introduction to Spices, Plantation Crops and Aromatic Crops, Kumar N.J.B., Md.
   Dordrecht, Netherlands.
   University, USA.
   USA.

B.Sc (HORTICULTURE) SEMESTER – VI
Paper VIII(a) – MEDICINAL AND AROMATIC CROPS (Elective)
Theory syllabus

Unit I
History, importance, export and import potential, future prospects and constraints
in the cultivation of medicinal crops.
Aloe: Importance, origin and distribution, botany, species and varieties, soil,
climate, land preparation, propagation, crop duration, spacing and planting,
manuring, irrigation, intercultivation, harvesting, yield and chemical composition,
therapeutic and pharmaceutical uses.
Aswagandha: Importance, origin and distribution, botany, varieties, soil, climate,
propagation, manures, fertilizers and intercultivation, harvesting, crop duration,
method of harvesting, drying, grading and yield, chemical constituents; therapeutic
and pharmaceutical uses.

Unit II
Rauvolfia: Importance origin and distribution, botany, varieties, soil, climate,
propagation, spacing, planting, manuring, irrigation, weeding, harvesting, root
yield; therapeutic and pharmaceutical uses
Senna: Importance, origin and distribution, botany, varieties, soil, climate, land
preparation, propagation, sowing, manures and fertilizers, crop rotation and
intercropping, irrigation, weeding and interculture harvesting, drying, storage, yield.

**Pyrethrum**: Importance origin and distribution, botany, soil, climate, propagation, harvesting, chemical constituents, pharmaceutical uses.

**Unit III**

**Isabgol**: Importance, origin, distribution, botany, climate, propagation, harvesting; chemical constituents, therapeutic and pharmaceutical uses.

**Belladonna**: Importance, origin, distribution, botany climate propagation, harvesting; chemical constituents, therapeutic and pharmaceutical uses.

**Opium poppy**: Importance, botany, soil, climate, hand preparation, cultivation, chemical constituents, medicinal and pharmaceutical uses.

**Unit IV**

Introduction, history, importance, export and import potential, future prospects, opportunities and constraints in the cultivation of aromatic plants.

**Lemon grass**: Importance and uses, distribution, area and production, botany, varieties, soil, climate, land preparation, propagation, spacing, planting, manures and fertilizers, irrigation, interculture, harvesting and yield of oil.

**Geranium**: Importance and uses, origin, distribution, botany, varieties, soil, climate, propagation, spacing, planting, manures and fertilizers, irrigation, interculture, harvesting and yield of herb and oil.

**Unit V**

**Khusgrass & Palmrosa**: Importance and uses, origin, distribution, botany, types and varieties, soil, climate, land preparation, propagation, spacing, planting, manures and fertilizers, irrigation, interculture, harvesting and yield.

**Mint**: Importance and uses, distribution, varieties. Chemical composition and uses, seasons, soil, climate, land preparation, propagation, spacing, planting, manures and fertilizers, irrigation, interculture, harvesting and yield.

**Basil**: Importance and uses, origin, distribution, botany, varieties, soil, climate, season, propagation, cultivation, harvesting and yield.

**Practicals**


27. Collection of locally available aromatic plants, plant description and preparations of herbarium.

28. Propagation and nursery techniques for important aromatic crops.

29. Propagation techniques for important medicinal plants.
30. Extraction of aromatic oil through steam distillation process at filed level Parts of steam distillation unit Principle of distillation process Hydro distillation of aromatic oil in the laboratory.
31. Identification and collection of important pests and disease of medicinal & aromatic crops.
32. Visit to CIMP or any other Research Institute working on medicinal and aromatic plants.

Reference Books:

B.Sc (HORTICULTURE ) SEMESTER – VI
Paper VIII(B) – Horticulture, Farm Finance and Marketing (Elective)

Theory
1. Definition of agri and horticultural finance – nature – scope – meaning – significance – micro and macro finance
2. Credit needs in agriculture – meaning and definition of credit – classification of credit based on time, purpose, security, lender and borrower
3. Credit analysis – economic feasibility tests – Returns to investment, Repaying capacity and Risk bearing ability (3 Rs)
5. Methods and mechanics of processing loan application
6. Repayment plans – lumpsum repayment / straight end repayment, amortized decreasing repayment, amortized even repayment, variable or quasi variable repayment plan, future repayment plan and optional repayment plan
7. Recent trends in agricultural finance – social control and rationalization of banks
10. Schemes for financing weaker sections – Differential Interest Rate (DIR), Integrated Rural Development Programme (IRDP), Ganga Kalyan Yojana (GKY), Swarnajayanti Gram Swarozgar Yojana (SGSY), Self Help Groups (SHGs) etc.

11. Crop insurance – meaning and its advantages – progress of crop insurance scheme in India – limitations in application – agricultural insurance company of India – National Agricultural Insurance Scheme (NAIS) – salient features – weather insurance

12. Higher financing agencies – Reserve Bank of India (RBI) – origin – objectives and functions – role of RBI in agricultural development and finance; National Bank for Agriculture and Rural Development (NABARD) – origin, functions, activities and its role in agricultural development; International Bank for Reconstruction and Development (IBRD); International Monetary Fund (IMF); International Development Agency (IDA); Asian Development Bank (ADB) – insurance and credit guarantee corporation


14. Origin and history of Indian co-operative movement – co-operative movement during pre-independence period – progress of cooperative movement during post-independence period

15. Shortcomings of Indian co-operative movement and remedies – recommendations of various committees – development of co-operative credit and non-credit organizations – co-operative credit structure

16. Classification of co-operative credit institutions – Short Term (ST), Medium Term (MT) and Long Term (LT) credit – Primary Agricultural Co-operative Credit Societies (PACS) – Farmers Service Societies (FSS) – Multipurpose Co-operative Credit Schemes (MPCS) and Large sized Adivasi Multipurpose Co-operative Societies (LAMPS) – objectives and functions – reorganization of rural credit delivery system and concept of single window system – Andhra Pradesh mutually aided Co-operative Societies Act, 1996


19. Classification of markets – on the basis of location, area of coverage, time span, volume of transaction, nature of transaction, number of commodities, degree of competition, nature of commodities, stage of marketing, extent of public intervention, type of population served, accrual of marketing margins


22. Remedial measures - regulated markets - definition - important features of regulated markets - functions - progress and defects
23. Cooperative marketing - meaning - structure - functions of cooperative marketing societies - National Agricultural Cooperative Marketing Federation (NAFED) and State Agricultural Cooperative Marketing Federations (MARKFED) - state trading - objectives - types of state trading
24. Warehousing - meaning - warehousing in India - Central Warehousing Corporation (CWC) - working of warehouses - advantages - State Warehousing Corporations (SWC) - Food Corporation of India (FCI) - objectives - functions
25. Quality control - agricultural products - Agricultural Produce Grading and Marketing Act (AGMARK) - CODEX - need of CODEX certification - relevance
26. Producers surplus - meaning - marketable surplus - marketed surplus - importance - factors influencing marketable surplus - marketing channels - definition
27. Market integration - definition - types of market integration - horizontal, vertical and conglomeration - marketing efficiency - meaning - definitions - technical or physical or operational efficiency - pricing or allocative efficiency
28. Marketing cost - margins - price spreads - factors affecting the costs of marketing - reasons for higher marketing costs of agricultural commodities - ways of reducing marketing costs for farm products
29. Characteristics of agricultural and horticultural product prices - agricultural price stabilization - need for agricultural price policy - Commission for Agricultural Cost and Prices (CACP) - administered prices - minimum support price, procurement price and issue price
30. Risks on marketing - meaning - types of risks - measures to minimize risks - speculation - hedging - future trading - meaning - commodities for future trading - services rendered by a forward market - dangers of forward markets - contract farming / contract farming - price forecasting
31. International trade - definition - difference between international and inter-regional trade - free trade vs. protection
32. The General Agreement on Trade and Tariffs (GATT) - World Trade Organization (WTO) - Agreement on Agriculture (AoA) - Market access - Aggregate Measures of Support (AMS) - export subsidies - Sanitary and Phyto-sanitary measures (SPS) - Trade Related Intellectual Property Rights (TRIPs)

Practicals

Study of loan application forms
Working out the various repayment plans
Study of lending procedures of bank
Study of commercial banks, Regional Rural Banks (RRBs), National Bank for Agriculture and Rural Development (NABARD), Primary Agricultural Co-operative credit Societies (PACS) and District Central Co-operative Bank (DCCB)
Study of Self Help Groups (SHGs)
Estimation of scale of finance, indemnity and Kisan credit card limits
Study of Farmers Service Societies (FSS), Dairy Cooperatives and any other cooperative institutions
Identification of marketing channels for agricultural products and livestock
Study of rythu bazaars, fruit market, livestock markets, regulated and unregulated markets
Computation of market costs, margins and price spread
Estimation of marketed and marketable surplus of different commodities
Visit to marketing institutions – MARKFED
Study of SWC / CWC and State Trading Corporation (STC)
Study of Food Corporation of India (FCI)

References

B.Sc. Degree Examination
Horticulture
Semester-I
Paper-I Fundamentals of Horticulture

Time: 3hrs
Max. Marks: 75

Section-A
Answer any Five of the Following Questions 5x5=25M
1. Scope for Horticulture in India.
2. Vegetable zones in Andhra Pradesh.
3. Planting densities.
5. Pruning.
7. Apical grafting methods.
8. Softwood grafting.

Section-B
Answer All of Following questions 5×10=50M

9(a) Discuss the Importance of Horticulture with reference to the economy, employment generation and environmental protection.

(OR)

(b) Give a brief account on divisions of horticulture and nutritive value of horticultural crops.

10(a) Define nursery. Write a brief note on three types of nursery beds with some examples.

(OR)

(b) Discuss briefly the different systems of planting orchards, their merits and demerits.

11(a) Explain different irrigation methods and add a note on their merits and demerits.

(OR)

(b) Discuss different training techniques of fruit crops and, their merits and demerits.

12(a) Discuss various cropping systems, their merits and demerits.

(OR)

(b) Define fruitfulness and unfruitfulness. Write a critical note on factors influencing them with suitable examples.

13(a) Define propagation and discuss the various techniques of propagation by stem cuttings.

(OR)

(b) Write a brief account on plant propagation by layering.
B.Sc. Degree Examination
Horticulture
Semester-II
Paper-II Postharvest Technology of Horticulture Plants

Time: 3hrs  Max. Marks: 75

Section-A
Answer any Five of the Following Questions  5×5=25M
1. Maturity indices.
2. Preharvest treatments.
3. Waxing.
4. Chemicals that delay ripening.
5. Secondary causes of losses.
7. Canned foods, causes of spoilage.

Section-B
Answer All of Following questions  5×10=50M

9(a) Discuss briefly the factors responsible for maturity and ripening .
    (or)
(b) Make a brief account on harvesting methods of horticultural crops.

10(a) Discuss the effect of ethylene in postharvest technology .
     (or)
(b) Write a brief note on postharvest factors.

11(a) Make a brief account on different primary causes of losses.
     (or)
(b) Discuss the impact of postharvest losses.
12(a) Write an essay on preparation and preservation of three types of unfermented fruit beverages.

(or)

(b) Explain briefly the five methods of preservation and add a note on their principles.

13(a) Explain different types of wine preparation.

(or)

(b) Explain the preparation of jams and jellies.