

GOVERNMENT COLLEGE (AUTONOMOUS)

RAJAMAHENDRAVARAM

(ESTD: 1853, NAAC Re-Accredited with Grade A+)

DEPARTMENT OF BOTANY



BOS MEETING B.Voc. HORTICULTURE

2022-2023

Semester	Course	Title of the Course	Hrs./Week	Credits	CCE	E.E.	Total
FIRST YEAR							
Sem.-I	1	Fundamentals of Horticulture and Soil Science	4	4	25	75	100
		Practical – 1	2	1	-	50	50
	2	Plant Propagation and Nursery Management	4	4	25	75	100
		Practical – 2	2	1	-	50	50
Sem.-II	3	Basics of Vegetable Science	4	4	25	75	100
		Practical – 3	2	1	-	50	50
	4	Pests and diseases of horticulture plants and their management	4	4	25	75	100
		Practical – 4	2	1	-	50	50
Apprentice/On Job Training for 02 months							
SECOND YEAR							
Sem.-III	5	Fruit crop production technology	4	4	25	75	100
		Practical – 5	2	1	-	50	50
	6	Vegetable crop production technology	4	4	25	75	100
		Practical – 6	2	1	-	50	50
Sem.-IV	7	Plantation crops and medicinal crops	4	4	25	75	100
		Practical – 7	2	1	-	50	50
	8	Pests and disease management of horticultural crops	4	4	25	75	100
		Practical – 8	2	1	-	50	50
Apprentice/On Job Training for 02 months							

THIRD YEAR							
Sem - V	9A	Ornamental Horticulture	4	4	50	50	100
		Practical – 9A	2	1	-	50	50
	10A	Commercial Floriculture	4	4	50	50	100
		Practical – 10A	2	1	-	50	50

OR

	9B	Precision Farming and Protected Cultivation	4	4	50	50	100
		Practical – 9B	2	1	-	50	50
	10B	Post-harvest Management of Horticultural Crops	4	4	50	50	100
		Practical – 10B	2	1	-	50	50

OR

	9C	Water Management in Horticultural Crops	4	4	50	50	100
		Practical – 9CC	2	1	-	50	50
	10C	Soil Fertility and Nutrient Management	4	4	50	50	100
		Practical – 10C	2	1	-	50	50

OR

	9D	Dry land Horticulture	4	4	50	50	100
		Practical – 9D	2	1	-	50	50
	10D	Plantation Crops	4	4	50	50	100
		Practical – 10D	2	1	-	50	50

Note: For Semester–V, for the domain subject HORTICULTURE, any one of the four pairs of SECs shall be chosen as courses 6 and 7, i.e., 6A & 7A or 6B & 7B or 6C & 7C or 6D & 7D. The pair shall not be broken (ABCD allotment is random, not on any priority basis).

GOVERNMENT COLLEGE (AUTONOMOUS), RAJAHMUNDRY

I B.Voc –Horticulture I/I Semester (w.e.f. 2022-23)

Core Course I: Fundamentals of Horticulture and Soil Science

Total Teaching Hours 60 Hrs @4hrs/Week

Credits: 03

Learning Outcomes: On successful completion of this course, the students will be able to:

- Understand the scope and potential of horticulture products in India and Andhra Pradesh.
- Classify the horticulture plants based on soil and climate.
- Illustrate different systems of planting in an orchard and predict the number of plants in a given land.
- Demonstrate the methods and types of training and pruning.
- Explain the basics of soil science and justify the role of soil as a medium for plant growth
- Explain about integrated nutrient management and demonstrate the skills of soil testing.

Unit I: Introduction to Horticulture

12 Hrs.

1. Horticulture: Definition, importance of horticulture in terms of economy, production. Employment generation, environmental protection and human resource development.
2. Divisions of horticulture with suitable examples and their importance.
3. Area, production of Horticultural crops in A.P. and India.
4. Fruit and vegetable zones of India and Andhra Pradesh.
5. Export scenario and scope for Horticulture in India.

Unit II: Classification Horticulture Crops

12 Hrs.

1. Classification of horticultural crops based on soil and climatic requirements.
2. Vegetable crop gardens – Nutrition and kitchen garden – tracer garden – vegetable forcing – market garden – roof garden.
3. Gardens in floriculture – flower gardens – soil and mixed gardens; land scape Horticulture.

Unit III: Characteristics of Orchards

12 Hrs.

1. Orchard: Definition, different systems of planting orchards – square, rectangular Quincunx, hexagonal and contour.
2. Calculation of planting densities in different systems of planting.
3. Different types and methods of pruning.
4. Training: Definition, principles and objectives; merits and demerits of open and close centered, and modified leader systems.

Unit IV: Physico-chemical characteristics of Soil

12 Hrs.

1. Soil: Definition, minerals and weathering to form soils; factors of soil formation.
2. Soil taxonomy; soil color, texture and structure; other physical properties and stability.
3. Soil colloids and charges; ion adsorption and exchange; soil temperature and soil air.
4. Soil pH and acidity; soil alkalinity and salinity.

Unit V: Soil as a living matter

12 Hrs.

1. Soil organic matter – composition and decomposability.
2. Humus – fractionation of organic matter.
3. Soil biology: Soil microorganisms and fauna –beneficial and harmful roles.
4. Integrated nutrient management and soil tests.

Text books:

- **Prasad and Kumar , 2014.:** Principles of Horticulture 2nd Edition Agribios India
- **Kumar, N., 1990** Introduction to Horticulture. Rajyalakshmi Publications, Nagarkoil, Tamilnadu
- **Jithendra Singh, 2002.** Basic Horticulture. Kalyani Publishers, Hyderabad
- **Kausalkumar Misra and Rajesh Kumar, 2014** Fundamentals of Horticulture, Biotech books
- **Brady Nyle C and Ray R Well 2014** Nature and Properties of Soil, Pearson Educational Inc , New Delhi
- Indian society of Soil Science IARI, New Delhi

Practical syllabus of Horticulture Core Course – 1/ Semester – I
Fundamentals of Horticulture and Soil Science
(Total hours of teaching – 30 @ 02 Hrs. /Week)

1. Study of features of orchard planning and layout orchard.
2. Study of tools and implements in Horticulture.
3. Identification of various Horticulture crops.
4. Lay out of nutrition garden.
5. Preparation of nursery beds to sow vegetable seeds.
6. Digging of pits for fruit plants.
7. Layout of different Planting systems.
8. Study of different methods of training.
9. Study of different methods of pruning.
10. Preparation of fertilizer mixtures and field application.
11. Preparation and application of growth regulators.
12. Layout of different irrigation systems.
13. Identification and management of nutritional disorders in important fruit, Vegetable and flower crops.

I year B.Voc. Program Examinations at I Semester End Botany -1:
Fundamentals of Horticulture and Soil Science
Model Question Paper (w.e.f. 2019-20)

Time: 2 ½ Hrs.

Max. Marks: 50

Section - A

5 x 4 = 20M

Answer any Five of the following questions. Draw diagrams wherever necessary.

1. (a) Olericulture (b) Pomology
2. Kitchen garden
3. (a) Kitchen garden (b) Market garden
4. (a) Hexagonal orchard (b) Contour orchard
5. Soil
6. (a) Acidity (b) Alkalinity
7. Humus
8. Integrated Nutrient Management

Section - B

3 x 10 = 30 M

Answer any Three of the following questions. Draw neat and labeled diagrams wherever necessary.

9. Discuss about fruit and vegetable zones in Andhra Pradesh.
10. Describe how horticulture plants are classified based on soil requirement?
11. Describe calculation methods used in different planting systems.
12. Discuss about soil taxonomy.
13. Describe the soil microorganisms and soil fauna. Add a note on their beneficial and harmful roles.
14. Write an essay on influence of climatic factors on horticulture crops growth

BOT -133

Government College (Autonomous), Rajahmundry

Blue Print

Unit no. / Title	SAQ	LAQ	Marks allotted to the Module
Unit- 1/ Introduction to horticulture	1	1	15
Unit- 2/ Classification of horticulture crops	1	1	15
Unit - 3/ Characteristics of Orchards	2	1	20
Unit- 4/ Physico-chemical characteristics of Soil	2	1	20
Unit- 5/ Soil as a living matter	2	1	20
Total marks allotted to all questions including choice =	08	05	90

Note: Question paper setters are requested to adhere strictly to the above blue Print while preparing the said paper

Model Question Paper for Practical Examination
I Semester /Horticulture Core Course - 1
Fundamentals of Horticulture and Soil Science

Max. Time: 3 Hrs.

Max. Marks: 50

1. Identify the horticulture tool/equipment and write its uses. 6 M
2. Draw the layout of a kitchen garden. 6 M
3. An irrigation method followed for horticulture crops with a neat sketch. 6 M
4. A) A planting system followed in an orchard with a neat diagram. 6 M
B) A farmer wants to raise a mango orchard in one hectare of land with a spacing of 8×8 m and now calculate the number of plants he can be adopted if he chose the quincunx system of planting.
4 M
C) A farmer wants to raise oil palm in one hectare of land with a spacing of 7.5×7.5 m and now calculate the number of plants he can be adopted if he chose the hexagonal system of planting.
4 M
5. Demonstration of a training method. 4 M
6. Record + viva voice 10 + 4 =14 M

Suggested co-curricular activities for Horticulture Core Course – 1 in Semester- I:

A. Measurable:

a. Student seminars:

1. Importance, scope and statistics of horticulture in India and Andhra Pradesh.
2. Branches of horticulture with suitable examples.
3. Climatic zones of horticulture in India and Andhra Pradesh.
4. Classification of horticultural crops based on soil and climate.
5. Vegetable gardens.
6. Ornamental gardens.
7. Systems of planting in an orchard.
8. Types and methods of pruning in horticultural crops.
9. Training methods in horticultural crops.
10. Soil taxonomy.
11. Weathering process.
12. Integrated nutrient management.

b. Student Study Projects:

1. A report on kitchen gardens in his/her residential area
2. A report on methods of planting systems for horticultural crops his/her residential Area.
3. Observations and preparation of soil colour charts for his/her native district.
4. Collection and nutrient analysis of soil samples of a locality.
5. A report on acidity, alkalinity and salinity of soil samples in his/her native district.
6. A report on soil fauna of a locality.
7. Determination of pH, EC and Organic carbon of soil sample from a locality.
8. Collection and identification of weeds in local horticulture crop fields.
9. Isolation and enumeration of soil microorganisms of a horticulture crop field.
10. Isolation of N₂ fixing and phosphate solubilizing microorganisms of a horticulture Crop field.
11. Collection and documentation of data on nutritional disorders of horticultural crops in a locality.
12. Study of different tools and implements being used in horticulture farms by local farmers.

c. Assignments: Written assignment at home / during '0' hour at college; preparation of Charts with drawings, making models etc., on topics included in syllabus.

B. General:

1. Group Discussion (GD)/ Quiz/ Just a Minute (JAM) on different modules in syllabus of the course.
2. Visit to Horticulture University/Research station.

GOVERNMENT COLLEGE (AUTONOMOUS), RAJAHMUNDRY

I Semester /Horticulture Core Course - II

Plant Propagation Methods and Nursery Management

(Total hours of teaching – 60 @ 04 Hrs. /Week)

Learning Outcomes: On successful completion of this course, the students will be able

To:

- Explain sexual and asexual propagation methods of plants.
- Demonstrate skills on vegetative propagation of plants.
- Demonstrate the techniques on raising of different types of nursery beds
- Justify the role of various propagation structures used to raise horticulture plants.
- Understand the regulation to establish a plant nursery and quality parameters to be maintained.
- Implement different routine/regular activities in a nursery.
- Understand the economics of a plant nursery and can maintain necessary records.

Unit -1: Sexual propagation

12 Hrs.

1. Sexual propagation – advantages and disadvantages.
2. Seed germination, process of seed germination; factors affecting seed germination;
3. Pre-germination treatments and viability tests; sowing methods of seeds.
4. Polyembryony in propagation of *Opuntia*, trifoliolate orange, mango and *Citrus*.

Unit -2: Asexual propagation

12 Hrs.

1. Asexual propagation – advantages and disadvantages.
2. Using bulbs, corms, tubers and rhizomes to raise nursery.
3. Stolons, runners and offsets in raising nursery.
4. Apomixes: Definition; role of apomictics in propagation of apple, mangosteen and *Citrus*.

Unit- 3: Vegetative propagation techniques

12 Hrs.

1. Cuttings: Definition, propagation by root, leaf and stem cuttings.
2. Layering: Definition, techniques of simple, serpentine, mound, trench and air layering.
3. Grafting: Definition; approach and detached scion (Veneer, whip, cleft, side and bark) grafting techniques.
4. Budding: Definition; techniques of T- , patch and chip budding.

Unit – 4: Basic requirements of a nursery

12 Hrs.

1. Plant nursery: Definition, importance; Basic facilities for a nursery; layout and components of a good nursery.
2. Nursery beds – types, their merits and demerits; precautions to be taken during preparation.
3. Brief account of growing media; nursery tools and implements.
4. Containers for plant nursery.
5. Brief account of plant propagation structures.

Unit -5: Nursery management

12 Hrs.

1. Bureau of Indian Standards (BIS-2008) related to nursery; guidelines for nursery raising.
2. Nursery accreditation and Certification.
3. Seasonal activities and routine operations in a nursery; watering, weeding and control of pests and diseases.
4. Common possible errors in nursery activities.
5. Economics of nursery development and record maintenance; online nursery information and sales systems.

Practical syllabus of Horticulture Core Course –II / Semester - I
Plant Propagation Methods and Nursery Management
(Total hours of teaching – 30 @ 02 Hrs. /Week)

1. Observations on causes for dormancy in seeds and vegetative propagules.
2. Methods of breaking dormancy in seeds, tubers, vegetative buds and other vegetative Propagules.
3. Media for propagation of plants in nursery beds, pots and Mist chamber.
4. Preparation of nursery beds and sowing of seeds
- 5 Raising of root stock.
6. Preparation of plant material for potting.
7. Hardening of plants in the nursery.
8. Practicing different types of vegetative propagation techniques - cutting, layering Grafting and budding.
9. Preparation of plant growth regulators for seed germination and vegetative Propagation.

BOT -134
GOVERNMENT COLLEGE (AUTONOMOUS), RAJAHMUNDRY
I year B.Voc. Program Examinations at Core Course - II
Plant Propagation methods and Nursery Management
Model Question Paper (w.e.f. 2018-19)

Time: 3 Hrs.

Max. Marks: 50

Section -A

5 x 4=20 M

Answer any Five of the following questions. Draw diagrams wherever necessary.

1. Advantages and disadvantages of sexual propagation
2. Sowing methods of seeds
3. Advantages and disadvantages of asexual propagation
4. Offsets used to raise nursery
5. (a) Patch budding (b) Chip budding
6. Importance of plant nursery
7. Bureau of Indian Standards (BIS-2008) related to nursery
8. Online nursery information and sales systems.

Section - B

3 x 10=30 M

Answer any Three of the following questions. Draw neat and labeled diagrams wherever necessary.

9. Write an essay on pre-germination treatments and viability tests.
10. Describe bulbs, corms, tubers and rhizomes used to raise nursery.
11. Define layering. Discuss any four layering techniques practiced in horticulture.
12. Describe the layout of a horticulture nursery and its components.
13. Discuss the seasonal activities and routine operations in a plant nursery.
14. Write an essay on Plant propagation structures.

BOT -134

GOVERNMENT COLLEGE (AUTONOMOUS), RAJAHMUNDRY

Blue Print

Unit no. / Title	SAQ	LAQ	Marks allotted to the Module
Unit - 1/ Sexual propagation.	1	1	14
Unit - 2/ A sexual Propagation	1	1	14
Unit - 3/ Vegetative propagation techniques	2	2	28
Unit - 4/ Basic requirements of a nursery	2	1	18
Unit - 5/ Nursery management	2	1	18
Total marks allotted to all questions including choice =	08	05	92

Note: Question paper setters are requested to adhere strictly to the above blue Print while preparing the said paper

Model Question Paper for Practical Examination
I Semester /Horticulture Core Course - II
Plant Propagation Methods and Nursery Management

Max. Time: 3 Hrs.

Max. Marks: 50

- | | |
|--|--------------------|
| 1. Demonstrate methods to break seed dormancy. | 8 M |
| 2. Demonstrate a method of vegetative propagation. | 8 M |
| 3. Demonstrate routine practices in a nursery | 8 M |
| 4. Identify the tool/ equipment used in horticulture | $3 \times 4 = 12M$ |
| 5. Record + viva voice | $10 + 4 = 14 M$ |

Text books:

- **Sadhu. M .K. 1996.** Plant propagation, New Age International Publishers, New Delhi
- **Sarma. R. R. 2002** Propagation of Horticultural crops : Principles and practices Kalyani Publishers, New Delhi
- **Hartman, H.T. and D.E. Kester 1976** Plant propagation. Principles and Practices, Prentice Hall of India Pvt. Limited, Mumbai
- **Ratha Krishnan, P. 2014.** Plant Nursery Management: Principles and Practices. Central Arid Zone Research Institute (ICAR), Jodhpur

Suggested co-curricular activities for Horticulture Core Course – 2 in Semester- II:

A. Measurable:

a. Student seminars:

1. Asexual and sexual methods for propagation of horticulture plants.
2. Various methods of cuttings for propagation of horticulture plants.
3. Various methods of layering for propagation of horticulture plants.
4. Various methods of grafting for propagation of horticulture plants.
5. Various methods of budding for propagation of horticulture plants.
6. Raising and management of nursery.
7. Plant propagation structures - care and maintenance.
8. Role of apomicts for propagation of horticulture plants.
9. Nursery certification procedure.
10. Pest and disease Management in a nursery.

b. Student Study Projects:

1. Propagation of some horticulture plants through cuttings.
2. Propagation of some horticulture plants through layering
3. Propagation of some horticulture plants through grafting
4. Propagation of some horticulture plants through budding
5. Collection of data on disease symptoms in a local nursery.
6. A report on economics of different media used in nursery.
7. A report on different plant growing containers in their local area.
8. Preparation of different models of Propagation structures.
9. A report on cost of establishing various plant propagation structures.
10. A report on propagation methods practiced by local's farmers.

c. Assignments: Written assignment at home / during '0' hour at college; preparation of Charts with drawings, making models etc., on topics included in syllabus.

B. General:

1. Group Discussion (GD)/ Quiz/ Just a Minute (JAM) on different modules in syllabus Of the course.
2. Visit to a nursery in a Horticulture University/Research station or Commercial nursery.

II B.Voc Semester /Horticulture Core Course - III
Basics of Vegetable Science (Olericulture)
(Total hours of teaching – 60 @ 04 Hrs. /Week)

Learning Outcomes: On successful completion of this course, the students will be able To:

- Distinguish the growing of vegetables according to season and climate
- Get detailed knowledge on cultivation aspects of different vegetables
- Understand and explain the special intercultural operations done in vegetable crops
- Study of morphology and taxonomy of different vegetable crops
- Study of different varieties of vegetable crops
- Identify the diseases and pests of vegetable crops and their management

Unit – 1: Introduction to Vegetable crops **12 Hrs.**

1. Importance of vegetable cultivation in India and Andhra Pradesh.
2. Classification and Nutritive value of vegetables.
3. Area and production of vegetables in India and Andhra Pradesh.
4. Export and import potential of vegetables in India. Constraints in vegetable production and remedies to overcome them.

Unit – 2: Solanaceous and Leafy vegetables **12 Hrs.**

Importance, morphology and taxonomy, varieties, climate and soil, seeds and sowing, Manuring, irrigation, intercultural operations, diseases and their control, harvesting and Yield of following crops:

Cultivation of (a) Brinjal (b) Tomato (c) *Capsicum* (d) Spinach (e) Coriander and (d) *Mentha*

Unit – 3: Root and Tuber crops **12 Hrs.**

Importance, morphology and taxonomy, varieties, climate and soil, seeds and sowing, manuring, irrigation, intercultural operations, diseases and their control, harvesting and yield of following crops:

Cultivation of (a) Carrot (b) Beet root (c) Tapioca and (d) *Colocasia*

Unit – 4: Cole crops **12 Hrs.**

Importance, morphology and taxonomy, varieties, climate and soil, seeds and sowing, manuring, irrigation, intercultural operations, diseases and their control, harvesting and yield of following crops:

Cultivation of (a) Cabbage and (b) Cauliflower

Unit – 5: Leguminous vegetables **12 Hrs.**

Importance, morphology and taxonomy, varieties, climate and soil, seeds and sowing, manuring, irrigation, intercultural operations, diseases and their control, harvesting and yield of following crops:

Cultivation of (a) Cluster bean (b) Cow pea and (d) *Dolichos*

GOVERNMENT COLLEGE (AUTONOMOUS), RAJAHMUNDRY
Practical syllabus of Horticulture Core Course – III/Semester-II
Basics of Vegetable Science (Olericulture)
(Total hours of teaching – 30 @ 02 Hrs. /Week)

1. Demonstration of seed germination test for a vegetable seed.
2. Demonstration of seed viability test.
3. Identification of vegetable seeds and vegetable crops at different growth stages.
4. Preparing vegetable nursery beds.
5. Raising vegetable seedlings in nursery bed and portrays.
6. Identification of major diseases and insect pests of vegetables.
7. Land preparation for sowing/ transplanting of vegetable crops.
8. Sowing/ transplanting of vegetables in main field.
9. Fertilizer application for vegetable growing.
10. Irrigation practices in a vegetable crop field

Model Question Paper for Practical Examination
II Semester /Horticulture Core Course - III
Basics of Vegetable Science (Olericulture)

Max. Time: 3 Hrs.

Max. Marks: 50

- | | |
|---|----------------------|
| 1. Demonstration of seed germination/ viability test (A). | 10 M |
| 2. Demonstration of preparing nursery bed/ cultivation practice for a vegetable crop (B). | 10 M |
| 3. Identification of material (C & D -Vegetable plants) and writing scientific name, family and uses. | 2 x 4 = 8 M |
| 4. Identification of a disease on vegetable plant (E) | 4 M |
| 5. Identification and comment on a cultivation practice (F) | 4 M |
| 6. Record + Viva Voice | 10 + 4 = 14 M |

Text books:

- **Bose T K et al. (2003)** Vegetable crops, Naya Udhog Publishers, Kolkata.
- **Singh D K (2007)** Modern vegetable varieties and production, IBN Publisher Technologies, International Book Distributing Co, Lucknow.
- **Premnath, Sundari Velayudhan and D P Sing (1987)** Vegetables for the tropical region, ICAR, New Delhi

Suggested co-curricular activities for Horticulture Core Course -3 in Semester- II:

A. Measurable:

a. Student seminars:

1. Production technology of solanaceous crops.
2. Production technology of leafy vegetables.
3. Production technology of root and tuber crops.
4. Production technology of cole crops.

5. Production technology of leguminous crops.
6. Special intercultural operations in vegetable crops.
7. Major pests and diseases of vegetable crops and their management.
8. Morphological characters of vegetable crops.
9. Maturity and harvesting indices of vegetable crops.
10. Nutritional aspects of vegetable crops.

b. Student Study Projects:

1. A report on vegetable crops in a locality.
2. Collection and preparation of herbarium of vegetable crops in their locality.
3. A report on various inter-culture practices for a vegetable crop.
4. Study report on nutritional disorders of vegetable crops in a locality.
5. Study report on diseases of vegetable crops in a locality.
6. A report on harvest to marketing for a vegetable crop.
7. A report on use of fertilizers, pesticides and herbicides in a local vegetable crop field.
8. Report on economics of a vegetable crop in their locality.
9. A study report on irrigation practices for vegetable crops in an area.

c. Assignments: Written assignment at home / during '0' hour at college; preparation of Charts with drawings, making models etc., on topics included in syllabus.

B. General:

1. Group Discussion (GD)/ Quiz/ Just a Minute (JAM) on different modules in syllabus
Of the course.
2. Visit to Horticulture University/ Research Station to learn about various vegetable
Crops.
3. Visit to a vegetable nursery and vegetable crop field.

BOT - 140
GOVERNMENT COLLEGE (AUTONOMOUS), RAJAMAHENDRAVARAM
II B.Voc., - Horticulture - 3/ Core Course -III End (W.E.F. 2022-23)
Paper - 3: Basic science of vegetables (Olericulture)
Model Question Paper (w.e.f. 2019-20)

Time: 3 Hrs.

Max. Marks: 50

Section - A

5 x 4 = 20 M

Answer any Five of the following questions. Draw diagrams wherever necessary.

1. Nutritive value of vegetables
2. Constraints in vegetable production
3. Morphology and taxonomy of Brinjal
4. Climate and soil for carrot
5. Intercultural operations in Tapioca
6. Diseases of Cabbage and their control
7. Morphology and taxonomy of Cluster bean
8. Climate and soil for Cluster bean

Section - B

3 x 10 = 30 M

Answer any Three of the following questions. Draw neat and labeled diagrams wherever necessary.

1. Discuss the importance of vegetable cultivation in India and Andhra Pradesh.
2. Describe the cultivation practices for Tomato.
3. Write an essay on cultivation practices for *Colocasia*.
4. Morphology and taxonomy of Cabbage (b) Varieties of Cauliflower
5. Discuss the cultivation practices for Cowpea
6. Write essay on cultivation of carrot

Bot -140
**GOVERNMENT COLLEGE (AUTONOMOUS),
RAJAHMUNDRY**

Blue Print

Unit no. / Title	SAQ	LAQ	Marks allotted to the Module
Unit - 1 / Introduction to Vegetable crops	1	1	14
Unit - 2 / Solanaceous and Leafy vegetables	1	2	14
Unit - 3 / Root and Tuber crops	2	1	24
Unit - 4 / Cole crops	2	1	18
Unit - 5 / Leguminous vegetables	2	1	18
Total marks allotted to all questions including choice =	08	05	92

Note: Question paper setters are requested to adhere strictly to the above blue print while preparing the said paper

II Semester B.Voc Horticulture Core Course - IV

Pests and Diseases of Horticulture Plants and their Management
(Total hours of teaching – 60 @ 04 Hrs. /Week)

Theory:

Learning Outcomes: On successful completion of this course, the students will be able to:

- Develop a critical understanding of insect pests and plant disease symptoms.
- Examine and identify the pests and diseases of vegetable crops and their management
- Examine and identify the pests and diseases of ornamental crops and their management
- Examine and identify the pests and diseases of fruit crops and their management
- Identify and classify various insect pests on horticulture plants.
- Justify the significance of Integrated Plant Disease Management for horticultural crops.
- Classify the pesticides based on use, chemical nature, formulation, toxicity and action.

Unit – 1: Basics of Entomology and Plant Pathology **12 Hrs.**

1. Classification of Insects up to orders and families of economic importance; Study of insect pests (Distribution, host range, biology, nature of damage and management) in horticultural crops.
2. Disease triangle and disease pyramid; Plant Pathology : Definition
3. A general account on symptoms of plant diseases caused by Viruses and Bacteria.
4. A general account on symptoms of plant diseases caused by Fungi.

Unit – 2: Pests and diseases of Vegetables crops **12 Hrs.**

1. **Bhendi:** Spotted boll worms, Red cotton bug, Yellow vein mosaic.
2. **Cucurbits:** Fruit flies, Pumpkin beetles; Downy and powdery mildews.
3. **Potato:** Potato tuber moth, Golden cyst nematode; Late blight.
4. **Sweet Potato:** Sweet potato weevil, Vine borer; mottled necrosis.

Unit – 3: Pests and diseases of Fruit crops **12 Hrs.**

1. **Coconut:** Rhinoceros beetle, burrowing nematode; Ganoderma root rot, Grey blight
2. **Banana:** Banana weevil, banana aphids; Panama wilt. Bunchy top
3. **Cashew:** Tea mosquito bug. Cashew stem borer; Anthracnose, 2.Pink disease
4. **Custard apple:** Mealy bug, Fruit boring caterpillar; Anthracnose, Glomerella fruit rots

Unit – 4: Pests and diseases of Commercial Flower crops **12 Hrs.**

1. **Rose:** Rose aphid, Dieback, and black spot
2. **Marigold:** Aphids, leaf spot, and bud rot
3. **Gerbera:** Thrips, white flies and Blossom blight
4. **Gladiolus:** Cut worms, leaf eating caterpillar and corm rot.

Unit – 5: Management of Pests and Diseases **12 Hrs.**

1. Principles and methods of plant disease management.
2. **Integrated Plant disease management.**
3. Fungicides classification based on chemical nature; commonly used insecticides, fungicides, Bactericides and nematocides.
4. **Preparation of fungicidal solutions, slurries, pastes and their application.**

GOVERNMENT COLLEGE (AUTONOMOUS), RAJAHMUNDR
Practical syllabus of Horticulture Core Course – IV/ Semester-II
Pests and Diseases of Horticulture Plants and their Management
(Total hours of teaching – 30 @ 02Hrs. /Week)

1. Study of characteristics of insect pests, microbial pathogens, nematodes causing diseases on different plants given in the theory syllabus.
2. Identification of disease symptoms on different plants given in the theory syllabus.
3. Observing and acquiring knowledge on pesticides, fungicides etc.,
4. Acquaintance with methods of application of common fungicides.
5. Field visit and acquaintance with disease of crops

GOVERNMENT COLLEGE (AUTONOMOUS), RAJAHMUNDR
Model Question Paper for Practical Examination
II Semester /Horticulture Core Course - IV
Pests and Diseases of Horticulture Plants and their Management

Max. Time: 3 Hrs.

Max. Marks: 50

- | | |
|--|---------------------|
| 1. Identify and comment on insect diseases A & B | 2 x 5 = 10 M |
| 2. Identify and comment on microbial diseases C & D | 2 x 5 = 10 M |
| 3. Identify and comment on nematodal diseases E & F | 2 x 5 = 10 M |
| 4. Identify and comment on Pesticide/ Fungicides G & H | 2 x 4 = 06 M |
| 5. Record + Herbarium + Viva Voice | 10 + 4= 14 M |

Text books:

- **Verma L R and R C Sharma 1999.** Diseases of Horticultural Crops – Fruits, Indus Publishing, New Delhi.
- Diseases of Horticulture Crops and their management, TNAU Publ. Agrimoon.Com
- **Jagatap G P, D N Dhutraj and Utpal Dey. 2001.** Diseases of Horticultural crops and their management, Agrobios Publications

Suggested co-curricular activities for Semester- V:

A. Measurable :

a. Student seminars :

1. Disease symptoms and their management of vegetable crops
2. Disease symptoms and their management of ornamental crops
3. Disease symptoms and their management of fruit crops
4. Disease symptoms of nematode and their management in horticultural crops
5. Role of Integrated Pest Management (IPM) in horticultural crops
6. Role of Integrated Disease Management (IDM) in horticultural crops
7. Classification of insecticides
8. Classification of fungicides

b. Student Study Projects:

1. Identification and herbarium preparation of disease symptoms of vegetable crops
2. Identification and herbarium preparation of disease symptoms of ornamental Crops.
3. Identification and herbarium preparation of disease symptoms of fruit crops
4. Preparation of laminated photos of major diseases of horticultural crops
5. Preparation of laminated photos of major fungicides used in horticultural crops
6. Preparation of laminated photos of major insecticides used in horticultural crops

c. Assignments: Written assignment at home / during '0' hour at college; preparation of Charts with drawings, making models etc., on topics included in syllabus.

B. General:

1. Group Discussion (GD)/ Quiz/ Just a Minute (JAM) on different modules in syllabus Of the course.
2. Visit to Horticulture University/ Research Station/Horticultural fields.
3. Visit to Pesticide industries/shops.

RECOMMENDED ASSESSMENT OF STUDENTS:**Recommended continuous assessment methods for all courses:**

Some of the following suggested assessment methodologies could be adopted. Formal assessment for awarding marks for Internal Assessment in theory.

(A) Formal:

1. The oral and written examinations (Scheduled and surprise tests),
2. Simple, medium and Critical Assignments and Problem-solving exercises,
3. Practical assignments and laboratory reports,
4. Assessment of practical skills,
5. Individual and group project reports,
6. Seminar presentations,
7. Viva voce interviews.

(b) Informal:

1. Computerized adaptive testing, literature surveys and evaluations,
2. Peers and self-assessment, outputs form individual and collaborative work
3. Closed-book and open-book tests,

GOVERNMENT COLLEGE (AUTONOMOUS), RAJAHMUNDRY
II B.Voc., Horticulture Core Course - IV End (w.e.f. 2020-21)
Pests and Diseases of Horticulture Plants and their Management
Model Question Paper

Time: 3 Hrs.

Max. Marks: 50

Section - A**5 x 4 = 20M**

Answer any Five of the following questions. Draw diagrams wherever necessary.

1. (a) Disease triangle (b) Disease pyramid
2. Any two symptoms of Bacterial diseases in plants
3. Yellow vein mosaic of Bhendi
4. Late blight of Potato
5. *Ganoderma* root rot
6. Cashew stem bo
7. Rose aphid
8. Nematicides

Section - B**3 x 10 = 30M**

Answer any Three of the following questions. Draw neat and labeled diagrams wherever necessary.

1. Give a general account on symptoms of plant diseases caused by Viruses.
2. Discuss the pests and disease of Sweet potato.
3. Describe the pests and disease of Banana.
4. Write an essay on pests and disease of Marigold.
5. Discuss the principles and methods of plant disease management.
6. Explain the preparation of fungicide solution?

GOVERNMENT COLLEGE (AUTONOMOUS), RAJAHMUNDRY

Blue Print

	Unit no. / Title	SAQ	LAQ	Marks allotted to the Module
Unit - 1	Basics of Entomology and Plant Pathology	1	1	14
Unit - 2	Pests and diseases of Vegetables crops	1	1	14
Unit - 3	Pests and diseases of Fruit crops	2	2	24
Unit - 4	Pests and diseases of Commercial Flower crops	2	1	18
Unit - 5	Management of Pests and Diseases	2	1	18
Total marks allotted to all questions including choice =		08	05	92

Note: Question paper setters are requested to adhere strictly to the above blue Print while preparing the said paper.

GOVERNMENT COLLEGE (AUTONOMOUS), RAJAHMUNDRY
B.Voc (Horticulture) SEMESTER-III CORE –V (W.E.F. 2020-21)
FRUIT CROP PRODUCTION TECHNOLOGY.
Total Teaching Hours 60 Hrs @4hrs/Week Credits: 03

Unit –I

Definition – area and production of fruit crops in Andhra Pradesh – Orchard management

– Definition- Selection and layout of orchard - Physical features in orchard, planting Systems.

Unit –II

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.

Unit –III

Production technology of following tropical fruits – Mango, Banana, Citrus, Papaya, Sapota, Guava.

Unit –IV

Production technology of following sub-tropical and temperate fruits – Pineapple, Apple, Pear, Almond - Organic fruit production.

GOVERNMENT COLLEGE (AUTONOMOUS), RAJAHMUNDRY
B.Voc (Horticulture) SEMESTER-III CORE –V Practical Syllabus (W.E.F. 2020-21)
FRUIT CROP PRODUCTION TECHNOLOGY.
Total hours of teaching 30hrs 2hrs per week

1. Selection and layout of orchards and physical features in orchard
2. Different planting systems in fruit crops
3. Description and identification of varieties of Mango and Banana based on Flower and Fruit morphology.
4. Description and identification of varieties of Citrus.
5. Description and identification of varieties of Papaya, Sapota, Guava and Pine apple.
6. Description and identification of varieties of Pomegranate, Ber.
7. Training and Pruning of Mango, Guava and Citrus.
8. Pre-treatment of Banana suckers and desuckering in Banana
9. Manure & Fertilizer application including Bio-fertilizers in different fruit Crops (Methods of application, calculation of the required Manure & Fertilizers based on the nutrient content).
10. Visit to commercial orchards.

BOT -134
GOVERNMENT COLLEGE (AUTONOMOUS), RAJAHMUNDRY
II year B.Voc. Program Examinations at Core Course - V
Fruit Crop Production Technology
Model Question Paper (w.e.f. 2018-19)

Time: 3 Hrs.

Max. Marks: 50

Section -A

5 x 4=20 M

Answer any Five of the following questions. Draw diagrams wherever necessary.

1. Production of fruit crop in Andhra Pradesh
2. Physical features of orchard
3. Weed Management practices in fruit crops
4. Post harvesting Technology of fruit crops
5. Explain production Technology of citrus
6. Explain production Technology of Guava
7. Explain production Technology of Almond
8. Organic fruit production

Section - B

3 x 10=30 M

Answer any Three of the following questions. Draw neat and labeled diagrams wherever necessary.

9. Explain Location and site selection for orchard layout
10. Explain method of propagation and write about Advantages and disadvantages of sexual propagation?
11. Explain production Technology of Mango and Banana
12. Explain production Technology of Apple and Pineapple?

BOT -134
GOVERNMENT COLLEGE (AUTONOMOUS), RAJAHMUNDRY

Blue Print

Unit no. / Title	SAQ	LAQ	Marks allotted to the Module
Unit - 1	2	1	20
Unit - 2	2	1	20
Unit - 3	2	1	20
Unit - 4	2	1	20
Total marks allotted to all questions including choice =	08	04	80

Note: Question paper setters are requested to adhere strictly to the above blue Print while preparing the said paper

B.Voc. HORTICULTURE-SEMESTER-III CORE-V (W.E.F. 2020-21)
Practical MODEL QUESTION PAPER
Fruit Crop Production Technology

Time: 3 hrs.

Marks: 50M

A. Major experiment:	1X10=10M
B. Minor experiment:	3X6=18M
C. Spotters:	6X2=12M
D. Record & Viva:	5+5m = 10marks
	Total - 50marks

SUGGESTED READINGS

- Bose, T.K and Mitra, S. K. 1990. Fruits Tropical and Subtropical. Naya Prakash, Calcutta.
- Ranjit Singh, 1992. Fruits. N.B.T., New Delhi.
- Chattopadhyay, T. K 1997. Text book on Pomology (Fundamentals of fruit growing). Kalyani Publishers, Hyderabad.
- Chandra, K. L. (ICAR) 2002, 2001. Hand book of Horticulture. ICAR, New Delhi

GOVERNMENT COLLEGE (AUTONOMOUS), RAJAHMUNDRY
B.Voc (Horticulture) SEMESTER-III CORE –VI(W.E.F. 2020-21)
VEGETABLE CROP PRODUCTION TECHNOLOGY
Total Teaching Hours 60 Hrs @4hrs/Week Credits : 03

UNIT-I

Scope and importance of vegetable cultivation – area and production in Tamilnadu – Systems of vegetable cultivation – kitchen garden – truck garden and market garden – Gardening for Processing.

UNIT-II

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 .

Production technology of the following crops: Tomato, Brinjal, Chillies, Bhendi, Onion, Beans

UNIT-III

Production technology of the following crops: bitter gourds – Ridge gourds –Snake gourds - pumpkin - Water melon - Cabbage – Cauliflower.

UNIT-IV

Production technology of the following root crops Radish – Carrot, Yam, Alocasia, Potato Leafy vegetables : Amaranthus – Moringa – Palak

GOVERNMENT COLLEGE (AUTONOMOUS), RAJAHMUNDRY
B.Voc (Horticulture) SEMESTER-III CORE –VI Practical
Syllabus (W.E.F. 2020-21))
VEGETABLE CROP PRODUCTION TECHNOLOGY
Total Teaching Hours 30 Hrs @4hrs/Week Credits: 02

1. Layout of kitchen garden
2. Classification of vegetable crops
3. Nursery techniques for vegetable production and Hi-tech vegetable nursery production
4. Identification and description of Solanaceous vegetable varieties
5. Methods of main field preparation and transplanting of nursery grown seedlings
6. Nutritional deficiencies and physiological disorders in tropical and sub tropical vegetables
7. Identification and description of Okra and Legume vegetables
8. Identification and description of varieties of cucurbits
9. Harvesting indices and maturity standards in tropical vegetables
10. Visit to vegetable farmers fields, Visit to vegetable markets for study of marketing problem

BOT -134
GOVERNMENT COLLEGE (AUTONOMOUS), RAJAHMUNDRY
II year B.Voc. Program Examinations at Core Course - V
Vegetable Crop Production Technology
Model Question Paper (w.e.f. 2018-19)

Time: 3 Hrs.

Max. Marks: 50

Section -A

5 x 4=20 M

Answer any Five of the following questions. Draw diagrams wherever necessary.

1. Kitchen garden
2. Truck garden
3. Special Horticulture practices
4. Production technology of Tomato
5. Production technology of Pumpkin
6. Production technology of Bitter gourds
7. Production technology of Amaranthus
8. Production technology of Moringa

Section - B

3 x 10=30 M

Answer any Three of the following questions. Draw neat and labeled diagrams wherever necessary.

9. Explain scope and importance of vegetable cultivation
10. Explain the transplanting, manuring, irrigation and fertigation in vegetable cultivation?
11. Explain production Technology of cabbage and cauliflower
12. Explain production Technology of Carrot and potato?

BOT -134

GOVERNMENT COLLEGE (AUTONOMOUS), RAJAHMUNDRY

Blue Print

Unit no. / Title	SAQ	LAQ	Marks allotted to the Module
Unit - 1	2	1	20
Unit - 2	2	1	20
Unit - 3	2	1	20
Unit - 4	2	1	20
Total marks allotted to all questions including choice =	08	04	80

Note: Question paper setters are requested to adhere strictly to the above blue Print while preparing the said paper

B.Voc. HORTICULTURE-SEMESTER-III CORE-V (W.E.F. 2020-21)
Practical MODEL QUESTION PAPER
Vegetable Crop Production Technology

Time: 3 hrs.	Marks: 50M
B. Major experiment:	1X10=10M
B. Minor experiment:	3X6=18M
C. Spotters:	6X2=12M
D. Record & Viva:	5+5m =
10marks	
	Total - 50marks

SUGGESTED READINGS

- Bose, T.K and Mitra, S. K. 1990. Fruits Tropical and Subtropical. Naya Prakash, Calcutta.
- Ranjit Singh, 1992. Fruits. N.B.T., New Delhi.
- Chattopadhyay, T. K 1997. Text book on Pomology (Fundamentals of fruit growing). Kalyani Publishers, Hyderabad.
- Chandra, K. L. (ICAR) 2002, 2001. Hand book of Horticulture. ICAR, New Delhi

**GOVERNMENT COLLEGE (AUTONOMOUS),
RAJAHMUNDRY**

**B.Voc (Horticulture) SEMESTER-IV CORE –VII (W.E.F. 2022-
23) MEDICINAL AND PLANTATION CROPS**

Total Teaching Hours 60 Hrs @4hrs/Week

Credits: 03

Unit-I

Production technology of following crops:

Coconut: Uses, Varieties- Tall x dwarf hybrids (TxD), Dwarf x tall hybrids (DxT), Tall x tall hybrids (T x T). Soil, Climate, Propagation – Seed propagation, Selection of seed nuts, selection of seedling for planting. Preparation of pits and planting, Irrigation, Manuring and fertilization, methods of application of fertilizers, weeding. Harvesting, Yield, Storage.

Oil Palm: Introduction, uses, varieties, seed propagation, Climate – Sunshine and Temperature requirement Types of soils for oil palm growing regions, Spacing, Planting, Irrigation, Manuring, Weeding and Mulching Harvesting and yield

Cocoa: Introduction, products/Byproducts chocolate, varieties, Climate, Soil, Seed and Vegetative propagation, Cuttings, preparation of land, provision of Shade, Spacing, planting-Cocoa under Natural Shade, Intercropping Irrigation, Manuring, weeding, types of branching, training and pruning, Harvesting.

Unit-II

Cashew Nut: Introduction, uses, Climate, Soils, varieties/ hybrids, Propagation – Vegetative propagation, Epi-cotyl grafting and Cuttings. Planting, Branching Pattern, Irrigation, weeding, Manuring, Training and pruning, Rejuvenation, flowering, Harvesting, Yield.

Coffee: Introduction, soil, Climate, types- differences Arabica/robusta, branching, varieties, propagation, raising nurseries. Preparation of main field and planting, Provision of shade, Advantages of shade, Disadvantages of shade, Irrigation, Manuring, Training and pruning – Trenching, Mulching, Weeding, Liming, Flowering- season of flowering, Fruit set and harvesting and Yield.

MEDICINAL PLANTS

Unit-III

Aloe: Importance and uses, description of plant, species and varieties, soil, climate, land preparation, propagation crop duration, spacing & planting, manuring, irrigation, inter-cultivation, harvesting, yield and chemical composition.

Rauvolfia, Morinda: Importance and uses, botany, varieties, soil, climate propagation spacing, planting, manuring, irrigation, weeding, harvesting, root yield.

Aswagandha: Importance and uses, description of plant, varieties, soil, climate, propagation manures, fertilizers and inter cultivation Harvesting, crop duration, method of harvesting drying, grading and yield, chemical constituents.

Unit-IV

Citronella & Lemongrass: Importance and uses, botany, varieties, soil, climate, land preparation, propagation, spacing, planting, manures and fertilizers, irrigation, interculture, harvesting & yield of herb and oil.

Mint: Importance and uses, distribution, description of species of mint, varieties, chemical composition and uses, seasons, soil, climate, land preparation, propagation, spacing, planting, manures and fertilizers, irrigation, interculture, harvesting & yield

GOVERNMENT COLLEGE (AUTONOMOUS), RAJAHMUNDRY

B.Voc (Horticulture) SEMESTER-IV CORE VII-Practical Syllabus,
(w.e.f. 2020-21)

MEDICINAL AND PLANTATION CROPS

Total Teaching Hours 60 Hrs

Credits: 03

1. **Description and identification of coconut, & oil palm varieties/ Hybrids**
2. **Layout and planting of coconut, oil palm.**
3. **Description and identification of cacao varieties/ Hybrids.**
4. **Selection of mother palm, seed nuts and planting of seed nuts in the nursery of coconut.**
5. Visit of commercial plantations in the district
6. **Collection of locally available medicinal plants, plant description**
7. **Propagation techniques for two important medicinal plants**
8. **Important cultural aspects and harvesting techniques for important medicinal plants.**
9. Visit to nearest medicinal garden
10. **Preparation of herbarium of locally available medicinal plants**

SUGGESTED READINGS

- Shanmugavelu, K. G. Kumar, N and Nad Peter,

K.V.2005.

- Production Technology of Spices and Plantation Crops. Agrosis, Jodhpur.
- Jain, S. K. 1983. Medicinal plants. National Book Trust, New Delhi. Dastur J F 1982. Medicinal plants of India and Pakistan. Taraporevala sons and Co. Pvt. Ltd., Bombay.
- Atal, E. K and Kapur, B. M. 1982. Cultivation and Utilization of medicinal and aromatic plants

BOT -134
GOVERNMENT COLLEGE (AUTONOMOUS), RAJAHMUNDRY
B.Voc (Horticulture) SEMESTER-IV Examinations at Core Course - VII
MEDICINAL AND PLANTATION CROPS
Model Question Paper (w.e.f. 2018-19)

Time: 3 Hrs.

Max. Marks: 50

Section -A

5 x 4=20

M Answer any Five of the following questions. Draw diagrams wherever necessary.

13. Seed propagation
14. Types of soils
15. Byproducts chocolate
16. Epi-cotyl grafting
17. Method of harvesting
18. Chemical composition of Mint

Section - B

3 x

10=30 M Answer any Three of the following questions. Draw neat and labeled diagrams wherever necessary.

19. Write an essay on production technology of coconut?
20. Explain the production technology of cashew nut?
21. Explain production Technology of Ashwagandha?
22. Explain production Technology of Mint?

BOT -134
GOVERNMENT COLLEGE (AUTONOMOUS),
RAJAHMUNDRY

Blue Print

Unit no. / Title	SAQ	LAQ	Marks allotted to the Module
Unit - 1	2	1	20
Unit - 2	2	1	20
Unit - 3	2	1	20
Unit - 4	2	1	20
Total marks allotted to all questions including choice =	08	04	80

Note: Question paper setters are requested to adhere strictly to the above bluePrint while preparing the said paper

GOVERNMENT COLLEGE (AUTONOMOUS), RAJAHMUNDRY II
B.Voc (Horticulture) SEMESTER-IV
CORE –VIII
(W.E.F. 2020-21) PEST AND DISEASE MANAGEMENT OF
HORTICULTURAL CROPS

Total Teaching Hours 60 Hrs @3 Hrs / Week

Credits: 03

UNIT-I

Pest - categories – causes for pest for outbreak. Pest management - principles and components

. **Natural enemies in pest suppression.**

UNIT-II

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 warehouse, green house,
poly house. **Management techniques for plant parasitic nematodes.**

UNIT-III

Etiology, symptoms and integrated management of important diseases due to
fungi, bacteria, viruses, phytoplasma, phanerogamic parasites of the following
horticultural crops.

UNIT-IV

Pest and disease management of the following crops:

Fruits: Mango, Banana, Pomegranate, Papaya, and
Apple.

Vegetables: Brinjal, Tomato, Bhendi, Cucurbits,
Crucifers, Potato

Plantion crops: Coconut, Oilpalm, Cocoa, Coffee.

Flower crops: Rose, chrysanthemum, Antherium, Gerbera.

GOVERNMENT COLLEGE (AUTONOMOUS), RAJAHMUNDRY

B.Voc (Horticulture) SEMESTER-IV CORE –VIII Practical Syllabus (W.E.F. 2020-21)

PEST AND DISEASE MANAGEMENT OF HORTICULTURAL CROPS

Total Teaching Hours 60 Hrs @3 Hrs / Week

Credits: 02

1. **Collection of locally available medicinal plants, Plant description and preparation of Herbarium.**
2. **Collection of locally available Aromatic plants, Plant description and preparation of Herbarium.**
3. **Morphological description of locally available medicinal plants.**
4. **Morphological description of locally available Aromatic plants.**
5. **Propagation and nursery techniques for important medicinal plants**
6. **Propagation and nursery techniques for important Aromatic plants.**
7. **Harvesting techniques for important medicinal plants.**
8. **Harvesting techniques for important aromatic plants.**

SUGGESTED READINGS

1. David, B. V. and Kumaraswamy, T. 1978. Elements of Economic Entomology. Popular Book Depot. Madras.
2. Butani, D. K. 1984. Insects and Fruits. Periodical Expert Book Agency, New Delhi.
3. Mehrotra, R. S. Plant Pathology. Tata McGraw-Hill Publishing Company, New Delhi.
4. Rangaswamy, G and Bagyaraj, G. J. Agricultural Microbiology. Prentice – Hall of India, Pvt. Ltd. New Delh

BOT -134
GOVERNMENT COLLEGE (AUTONOMOUS), RAJAHMUNDRY
B.Voc (Horticulture) SEMESTER-IV Examinations at Core Course - VII
MEDICINAL AND PLANTATION CROPS
Model Question Paper (w.e.f. 2018-19)

Time: 3 Hrs.

Max. Marks: 50

Section - A

5 x 4=20

M Answer any Five of the following questions. Draw diagrams wherever necessary.

1. Green house
2. stem borers
3. Etiology,
4. Natural enemies in pest suppression
5. IPM
6. Pest - categories

Section - B

3 x 10=30 M

Answer any Three of the following questions. Draw neat and labeled diagrams wherever necessary.

7. Write an essay on pest management components and Principals?
8. Explain the Medicinal and Plantation crops?
9. Explain the integrated management of important diseases of Fungi?
10. Explain the Pest and disease management of Brinjal?

BOT -134
GOVERNMENT COLLEGE (AUTONOMOUS),
RAJAHMUNDRY

Blue Print

Unit no. / Title	SAQ	LAQ	Marks allotted to the Module
Unit - 1	2	1	20
Unit - 2	2	1	20
Unit - 3	2	1	20
Unit - 4	2	1	20
Total marks allotted to all questions including choice =	08	04	80

Note: Question paper setters are requested to adhere strictly to the above bluePrint while preparing the said paper

BOT - 147
GOVERNMENT COLLEGE (AUTONOMOUS), RAJAHMUNDRY
III B.Voc, - HORTICULTURE / V Semester End (w.e.f2022-23)
Core Course 9A: Ornamental Horticulture

I. Learning Outcomes:

Students at the successful completion of the course will be able to:

1. Acquire a critical knowledge of ornamental gardening and its significance.
2. Identify and explain living and non-living components in an ornamental garden.
3. Acquire skills on propagation and planting of various ornamental plants.
4. Perform managerial skills related to ornamental gardening.
5. Demonstrate skills of designing and developing ornamental gardens in public places.

II. Syllabus: (Hours: Teaching: 50, Lab: 30, Training: 05, others incl. unit tests: 05)

(Syllabi of theory and practical together shall be completed in 80 hours)

Unit -1: Introduction to Ornamental Horticulture (10h)

1. History, Definition, scope of gardening, aesthetic values; types of gardens in India.
2. Landscaping, basic principles and basic components.
3. Principles of gardening, garden components and adornments.
4. Lawn types, establishment and maintenance; methods of designing rockery and water garden.

Unit -2: Types of Ornamental gardens (10h)

1. Special types of gardens, trees, their design, their walk-paths, bridges, constructed features.
2. Garden structures – greenhouse, glass house, net house.
3. Values in landscaping; propagation-planting of shrubs and herbaceous perennials.

Unit-3: Plants in Ornamental gardens (10h)

1. Importance, design values, propagation, planting of following annuals, biennials and perennials:
(a) Climbers (b) Creepers (c) Palms (d) Ferns (e) Grasses (f) Cacti (g) Succulents

Unit-4: Ornamental gardening – public utility (10h)

1. Cultural operations in ornamental gardens.
2. Bio-aesthetic planning, definition, need; round country planning; urban planning and planting - avenues, educational institutions, and villages.
3. Beautifying railway stations, dam sites, hydroelectric stations, colonies, river banks, planting material for play grounds.

Unit-5: Ornamental gardening in residences (10h)

1. Bottle garden, terrariums.
2. Vertical gardens, roof gardens.
3. Culture of bonsai, art of making bonsai.

III. References:

1. Chadha, K.L. and Chaudhary, B. 1986. Ornamental Horticulture in India. Publication and Information division. ICAR, New Delhi.
2. K.V.Peter. 2009. Ornamental plants. New India Publishing Agency, New Delhi.
3. Arora, J.S. 2006. Introductory Ornamental Horticulture. Kalyani Publishers, Ludhiana
4. Bimaldas Chowdhury and Balai Lal Jana. 2014. Flowering Garden trees. Pointer publishers, Jaipur. India.

IV. Co-Curricular Activities (student field training by teacher: 05 hours):

a) Mandatory:

1. **For Teacher:** Training of students by the teacher in the classroom or in the laboratory for a total of not less than 10 hours on garden operations, lawn making, art of bonsai, plant propagation methods; using CAD in landscaping.
2. **For Student:** Individual laboratory work and visit to parks in public and private places, studying the living and non-living elements of an ornamental garden – landscaping; culminating writing and submission of a hand-written Field Work Report (various plants, growth habit, propagation, design of garden) not exceeding 10 pages in the given method or format.
3. Max marks for Field Work Report: 05

4. Suggested Format for Field work Report (*not exceeding 10 pages*): Title page with student details, index page, objective, stepwise work done, findings, conclusions and acknowledgements.
5. Unit tests (IE).

b) Suggested Co-Curricular Activities:

1. Training of students by related industrial experts.
2. Assignments (including technical assignments like identifying ornamental plants, types and styles of gardens, propagation of garden plants, landscaping)
3. Seminars, Group discussions, Quiz, Debates etc. (on related topics).
4. Preparation of videos on plant propagation, garden operations, ornamental gardening.
5. Collection of material/figures/photos related to gardening and landscaping in India and abroad, writing and organizing them in a systematic way in a file.
6. Visits to gardens and parks in public places and/or private firms; famous gardens in A.P. and India etc.
7. Invited lectures and presentations on related topics by field/industrial experts

BOT - 147

**GOVERNMENT COLLEGE (AUTONOMOUS), RAJAHMUNDRY
III B.Voc, - HORTICULTURE / V Semester End (w.e.f2022 - 23)**

Core Course 9A: Ornamental Horticulture – Practical syllabus

Learning Outcomes: On successful completion of this practical course, student will be able to:

1. Identify various components required for ornamental garden development.
2. Perform various skills related to establishment and maintenance of an ornamental garden.
3. Demonstrate skills of making developing a lawn and bonsai.
4. Make landscape design using CAD.

Practical (Laboratory) Syllabus: (30 hrs)

1. Identification and description of various plants grown in ornamental gardens.
2. Tools, implements and containers used in ornamental gardening.
3. Planning, designing and establishment of garden features viz. lawn, hedge and edge, rockery etc.,
4. Demonstration of types and styles of gardens using photos or videos.
5. Planning, designing and establishment of water garden, carpet bedding, shade garden, roof garden.
6. Preparation of land for lawn and planting.
7. Exposure to CAD (Computer Aided Designing)
8. Demonstration of bonsai making.
9. Study and creation of terrariums, vertical garden.

BOT -134
GOVERNMENT COLLEGE (AUTONOMOUS), RAJAHMUNDRY
III year B.Voc. Program Examinations at Core Course – 9A
Ornamental Horticulture
Model Question Paper (w.e.f. 2018-19)

Time: 3 Hrs.

Max. Marks: 50

SECTION – A

Answer any FIVE questions. Each question carries 5 marks.

5 x 4 = 20 M

1. Water garden
2. Herbaceous perennials
3. Annual climbers
4. Beautifying river banks
5. Terrariums
6. Lawntypes
7. Net house
8. Bottle garden

SECTION – B

Answer any THREE of the following. Each question carries 10 marks. 3 x 10 = 30 M

9. Write an essay on types of gardens in India.
10. Discuss about different features of special types of gardens.
11. Write an essay on creepers grown in ornamental gardens.
12. Explain about bio aesthetic planning in Educational Institutions.
13. Describe about vertical gardens and root gardens.
14. Write an essay on values of land scaping propagation

BOT -134
GOVERNMENT COLLEGE (AUTONOMOUS), RAJAHMUNDRY

Blue Print

Unit no. / Title	SAQ	LAQ	Marks allotted to the Module
Unit - 1/Introduction to Ornamental Horticulture	1	1	14
Unit - 2/ Types of Ornamental gardens	1	2	24
Unit - 3/ Plants in Ornamental gardens	2	1	18
Unit - 4/ Ornamental gardening – public utility	2	1	18
Unit - 5/ Ornamental gardening in residences	2	1	18
Total marks allotted to all questions including choice =	08	06	92

Note: Question paper setters are requested to adhere strictly to the above blue Print while preparing the said paper

Model Question Paper Pattern for Practical Examination
Semester – V/ B.Voc Horticulture Skill Enhancement Course
Core Course 9A: Ornamental Horticulture

Max. Time: 3 Hrs.

Max. Marks: 50

- | | |
|---|------------|
| 1. Demonstration of making a lawn /creating water garden 'A' | 8 |
| 2. Demonstration of making hedge and edge/ garden operations' 'B' | 10 |
| 3. Demonstration of bonsai technique/ designing a landscape 'C' | 12 |
| 4. Scientific observation and data analysis | 4 x 3 = 12 |

D. Climber/creeper/ palm

E. Fern/Cactus/succulent

F. Garden adornments

G. Tool/implement/container

5. Record + Viva-voce

5+3 = 8

Total = 50 M

GOVERNMENT COLLEGE (AUTONOMOUS), RAJAHMUNDRY
 III B.Voc, - HORTICULTURE / V Semester End (w.e.f2022-23)
 Core Course 10A: Commercial Floriculture

I. Learning Outcomes:

Students at the successful completion of the course will be able to:

1. Understand the significance of flowers in human life.
2. Acquire skills related to production techniques in floriculture.
3. Explain the breeding techniques of some flowering plants.
4. Demonstrate skills of protected cultivation in floriculture.
5. Perform skills in relation to post-harvest operations in floriculture.

II. Syllabus: (Hours: Teaching: 50, Lab: 30, Training: 05, others incl. unit tests: 05)

(Syllabi of theory and practical together shall be completed in 80 hours)

Unit-1: Basic concepts of floriculture (10h)

1. Aesthetic, cultural and industrial importance of flowers; domestic and export marketing of flowers.
2. Floriculture - Importance, area and production in Andhra Pradesh and India.
3. Scope and importance of commercial floriculture in A.P., and India.

Unit-2: Production technology-1 (10h)

1. **Production techniques** of following flowering plants for domestic and export market:
 (a) Rose (b) *Chrysanthemum* (c) Marigold (d) Tuberose (e) *Crossandra* (f) Jasmine

Unit-3: Production technology-2 (10h)

1. **Production techniques** of following flowering plants for domestic and export market:
 (a) *Anthurium* (b) *Gerbera* (c) *Gladiolus* (d) *Dahlia* (e) *Heliconia* (f) Orchid

Unit-4: Plant breeding of flowering ornamentals (10h)

1. Objectives and techniques in ornamental plant breeding.
2. Introduction, selection, hybridization, mutation and biotechnological technique for improvement of following ornamental and flower crops.
 (a) Carnation (b) *Petunia* (c) *Geranium* (d) *Cosmos* (e) *Hibiscus* (f) Snapdragon

Unit-5: Post-harvest practices in floriculture (10h)

1. Growing of flowering plants under protected environments such as glass house, plastic house, net house, etc.
2. **Importance of flower arrangement; Ikebana - techniques, types, suitable flowers and cut foliage.**
3. **Post-harvest technology of cut and loose flowers in respect of commercial flower crops.**
4. **Dehydration techniques for drying of flowers, scope importance and status**

III. References:

1. T.K. Bose, L.P. Yadav, P. Patil, P. Das and V.A. Partha Sarthy.2003. Commercial flowers. Partha Sankar Basu, Nayaudyog,206, Bidhan Sarani, Kolkata
2. S.K. Bhattacharjee and L.C. De. 2003. Advanced Commercial Floriculture. Aavishkar Publishers, Distributors, Jaipur, India.
3. V.L. Sheela, 2008. Flower for trade. New India Publishing Agency, New Delhi
4. Dewasish Choudhary and Amal Mehta. 2010. Flower crops cultivation and management. Oxford Book Company, Jaipur, India.

IV. Co-Curricular Activities (student field training by teacher: 05 hours):

a) Mandatory:

1. **For Teacher:** Training of students by the teacher in the classroom or in the laboratory for a total of not less than 10 hours on intercultural operations in floriculture, propagation techniques, breeding methods, post-harvest handling of flowers; floral designs and bouquet making.
2. **For Student:** Individual laboratory work and visit to floriculture fields/floriculture department in a Horticulture University/college - studying the cultivation practices from sowing/planting to harvesting of flowers, post-harvest techniques - written Field Work Report (various flowering plants, propagation, utilization/marketing) not exceeding 10 pages in the given method or format.
3. Max marks for Field Work Report: 05

4. Suggested Format for Field work Report (*not exceeding 10 pages*): Title page with student details, index page, objective, stepwise work done, findings, conclusions and acknowledgements.
5. Unit tests (IE).

b) Suggested Co-Curricular Activities:

1. Training of students by related industrial experts.
2. Assignments (including technical assignments like identifying commercially important flowering plants, cultivation practices, propagation and breeding methods, post-harvest practices)
3. Seminars, Group discussions, Quiz, Debates etc. (on related topics).
4. Preparation of videos on intercultural operations, cultivation, shelf and vase-life, commercial products from flowers.
5. Collection of material/figures/photos related to commercial floriculture in India and abroad, writing and organizing them in a systematic way in a file.
6. Visits to Floriculture fields and Horticulture University/college.
7. Invited lectures and presentations on related topics by field/industrial experts.

BOT - 147

**GOVERNMENT COLLEGE (AUTONOMOUS), RAJAHMUNDRY
III B.Voc., - HORTICULTURE / V Semester End (w.e.f2022-23)**

Core Course 10A: Commercial Floriculture – Practical syllabus

Learning Outcomes: On successful completion of this practical course, student will Be able to:

1. Identify different flowering plants of commercial value.
2. Perform skills in propagation of flowering plants.
3. Demonstrate skills of post-harvest handling of flowers.
4. Perform skills of floral arrangements or making floral products.

Practical (Laboratory) Syllabus: (30 hrs)

1. Identification of commercially important floricultural crops.
2. Propagation technique in *Hibiscus/Rose/Chrysanthemum/tuberose*.
3. Propagation technique in *Gladiolus/carnation/Petunia*
4. Sowing of seeds and raising of seedlings of a flowering plant.
5. Training and pruning of rose/Jasminum.
6. Drying and preservation of flowers.
7. Use of chemicals and other compounds for prolonging the vase life of cut flowers.
8. Flower arrangement practices.
9. Preparation of bouquets, garland,veni and gajara

BOT -134
GOVERNMENT COLLEGE (AUTONOMOUS), RAJAHMUNDRY
III year B.Voc. Program Examinations at Core Course – 10A
Commercial Floriculture
Model Question Paper (w.e.f. 2018-19)

Time: 3 Hrs.

Max. Marks: 50

SECTION – A

Answer any FIVE questions. Each question carries 5 marks.

5 x 4 = 20M

1. Export marketing of flowers
2. Scope and importance of commercial floriculture in A.P.
3. Soil and climate requirements of rose
4. Export marketing of Orchids
5. Objectives of ornamental plant breeding
6. Importance of flower arrangement
7. Area and production of flowers in India
8. Selection procedure for *Petunia*

SECTION – B

Answer any THREE of the following. Each question carries 10 marks.

3 x10 = 30M

9. Discuss about aesthetic, cultural and industrial importance of flowers.
10. Explain about the production technology of *Chrysanthemum*.
11. Describe the production technology of *Anthodium*.
12. Discuss about post-harvest technology of cut and loose flowers.
13. Explain the mutation and biotechnological techniques for improvement of *Petunia*
14. Write an essay on selection and hybridization techniques for improvement of *Cosmos*.

BOT -134
GOVERNMENT COLLEGE (AUTONOMOUS), RAJAHMUNDRY

Blue Print

Unit no. / Title	SAQ	LAQ	Marks allotted to the Module
Unit - 1/ Basic concepts of floriculture	1	1	14
Unit - 2/ Production technology-1	1	1	14
Unit - 3/ Production technology-2	2	1	18
Unit - 4/ Plant breeding of flowering ornamentals	2	1	18
Unit - 5/ Post-harvest practices in floriculture	2	2	28
Total marks allotted to all questions including choice =	08	05	92

Note: Question paper setters are requested to adhere strictly to the above blue Print while preparing the said paper

Model Question Paper Pattern for Practical Examination
Semester – V/ B.Voc Horticulture Skill Enhancement Course
Core Course 10A: Commercial Floriculture

Max. Time: 3 Hrs.

Max. Marks: 50

1. Perform seed sowing and nursery raising /propagation of a flowering plant 'A' 8
 2. Perform a breeding technique of a flowering plant/making floral design 'B' 10
 3. Making of bouquet/ garland/veni/gajara 'C' 12
 4. Scientific observation and data analysis 4 x 3 = 12
 - D. Commercially important flowering plant
 - E. Propagule for establishment
 - F. Preservation method
 - G. Product of floriculture
 5. Record + Viva-voce 5+3 = 8
- Total = 50 M

BOT - 147
GOVERNMENT COLLEGE (AUTONOMOUS), RAJAHMUNDRY
III B.Voc, – HORTICULTURE / V Semester End (w.e.f2022-23)
Core Course 9B: Precision Farming and Protected Cultivation

I. Learning Outcomes:

Students at the successful completion of the course will be able to:

1. Understand the importance of precision farming in present scenario.
2. Explain different types of greenhouses used for precision farming.
3. Acquire skills on construction of green houses.
4. Perform managerial skills related to precision farming under protected structures.
5. Demonstrate skills on cultivation high-value horticulture plants through precision farming.

II. Syllabus: (Hours: Teaching: 50, Lab: 30, Training: 05, others incl. unit tests: 05)

(Syllabi of theory and practical together shall be completed in 80 hours)

Unit -1: Introduction to Precision farming (10h)

1. Precision farming – Introduction and history, Importance and Scope.
2. Laser leveling, mechanized direct seed sowing seedling and sapling transplanting.
3. **Mapping of soils and plant attributes.**

Unit -2: Management in Precision farming (10h)

1. Site specific input application.
2. **Weed management, Insect pests and disease management.**
3. Yield mapping in horticultural crops.

Unit-3: Types of Greenhouses (10h)

1. Green house technology – Introduction viz. Importance, scope, advantages and dis-advantages.
2. Types of Green Houses based on shape, utility, construction and cladding materials.
3. Plant response to Greenhouse environment.

Unit-4: Construction of Greenhouse (10h)

1. **Planning and design of greenhouses.**
2. Design criteria of greenhouse for cooling and heating purposes.
3. Green house equipment; Materials of construction for traditional and low cost green houses.
4. Irrigation systems used in greenhouses.

Unit-5: Farming in Green house (10h)

1. **Net house cultivation, Passive solar green house, Greenhouse drying.**
2. Choice of crops for cultivation under greenhouses: Capsicum, Cucumber, Broccoli, Cabbage, Spinach, Lettuce.
3. **Cost estimation and economic analysis.**

III. References:

1. Balraj Singh. 2006. Protected cultivation of vegetable crops. Kalyani Publishers, Ludhiana.
2. Brahma Singh, 2014. Advances in Protected Cultivation. New India Publishing Agency. New Delhi.
3. Jitendra Singh, 2015. Precision Farming in Horticulture. New India Publishing Agency. New Delhi.
4. Reddy, P. and Parvatha. 2011. Sustainable crop protection under Protected Cultivation. Springer Publications. USA.

IV. Co-Curricular Activities (student field training by teacher: 05 hours):

a) Mandatory:

1. **For Teacher:** Training of students by the teacher in the classroom or in the laboratory for a total of not less than 10 hours on equipment and material in green house, preparation of soil and other media, irrigation systems and other practices in a greenhouse.
2. **For Student:** Individual laboratory work and visit to green house in a Horticulture University/ college and/or private sector, studying the structure, material and equipment, growing media, farming practices, irrigation, INM and IPM; culminating writing and submission of a hand-written Field Work Report (various crop plants, yield, economics) not exceeding 10 pages in the given method or format.
3. Max marks for Field Work Report: 05

4. Suggested Format for Field work Report (*not exceeding 10 pages*): Title page with student details, index page, objective, stepwise work done, findings, conclusions and acknowledgements.
5. Unit tests (IE).

b) Suggested Co-Curricular Activities

1. Training of students by related industrial experts.
2. Assignments (including technical assignments like types and styles of green houses, material and equipment, advantages and disadvantages of protected cultivation, yield-cost benefit analysis)
3. Seminars, Group discussions, Quiz, Debates etc. (on related topics).
4. Preparation of videos on precision farming; protected cultivation of high value fruit and vegetable crops.
5. Collection of material/figures/photos related to protected cultivation of horticulture crops in India and abroad, writing and organizing them in a systematic way in a file.
6. Visits to protected cultivation facilities in a Horticulture University or college and/or private firms.
7. Invited lectures and presentations on related topics by field/industrial experts

BOT - 147

GOVERNMENT COLLEGE (AUTONOMOUS), RAJAHMUNDRY

III B.Voc, – HORTICULTURE / V Semester End (w.e.f2022-23)

Course 9B: Precision Farming and Protected Cultivation – Practical syllabus

Learning Outcomes: On successful completion of this practical course, student will Be able to:

1. Identify various material and equipment required for greenhouse construction.
2. Perform various skills related to preparation of soil and other media for cultivation under a protected structure.
3. Demonstrate operational skills related to equipment in a greenhouse.
4. Make the calculation related to input-output economics.

Practical (Laboratory) Syllabus: (30 hrs)

1. Study of different types of greenhouses based on shape, utility.
2. Study of different types of greenhouses based on construction and cladding materials.
3. Testing of soil and water to study its suitability for growing crops in greenhouses.
4. Growing media, Soil culture- type of soil required.
5. Study of irrigation, drainage - flooding and leaching.
6. Soil pasteurization in peat moss and mixtures, Rock wool and other inert media.
7. Nutrient film technique (NFT), Hydroponics.
8. Study of cultivation of a crop in green house.
9. Economics of protected cultivation.

BOT -134
GOVERNMENT COLLEGE (AUTONOMOUS), RAJAHMUNDRY
III year B.Voc. Program Examinations at Core Course – 9B
Precision Farming and Protected Cultivation
Model Question Paper (w.e.f. 2018-19)

SECTION – A

Answer any FIVE questions. Each question carries 5 marks.

5 x 4 = 20 M

1. Importance and scope of precision farming
2. Insect pests in protected cultivation
3. Plant response to greenhouse environment
4. Heating in green houses
5. Passive solar green house
6. Cultivation of broccoli in green houses
7. Sapling transplanting in precision farming
8. Site specific input applications

SECTION – B

Answer any THREE of the following. Each question carries 10 marks.

3 x 10 = 30M

9. Describe the Laser leveling, mechanized direct seedling and sowing of seeds in precision farming.
10. Write an essay on mapping of soils and plant attribution.
11. Discuss about weed management and disease management under protected cultivation.
12. Explain about yield mapping in horticulture crops.
13. Write an essay on importance, advantages and disadvantages of greenhouse technology.
14. Discuss about the cultivation of *Capsicum* and *Cucumber* in green houses.

BOT -134

GOVERNMENT COLLEGE (AUTONOMOUS), RAJAHMUNDRY

Blue Print

Unit no. / Title	SAQ	LAQ	Marks allotted to the Module
Unit - 1/ Introduction to Precision farming	1	2	24
Unit - 2/Management in Precision farming	1	1	14
Unit - 3/ Types of Greenhouses	2	1	18
Unit - 4/ Construction of Greenhouse	2	1	18
Unit - 5/ Farming in Green house	2	1	18
Total marks allotted to all questions including choice =	08	06	92

Note: Question paper setters are requested to adhere strictly to the above blue Print while preparing the said paper

Model Question Paper Pattern for Practical Examination
Semester – V Horticulture Skill Enhancement Core Course: 9B
Precision Farming and Protected Cultivation

Max. Time: 3 Hrs.

Max. Marks: 50M

- | | |
|---|------------|
| 1. Performing skill on type and style of a greenhouse using a model 'A' | 8 |
| 2. Making a growing medium used in protected cultivation 'B' | 10 |
| 3. Performing NFT or Hydroponics 'C' | 12 |
| 4. Scientific observation and data analysis | 4 x 3 = 12 |
| D. Material for green house | |
| E. Equipment in green house | |
| F. Style of green house | |
| G. Modern techniques in precision farming/high value crop | |
| 5. Record + Viva-voce | 5+3 = 8 |

Core Course 10B: Post-harvest Management of Horticultural Crops

I. Learning Outcomes:

Students at the successful completion of the course will be able to:

1. Understand the basic concepts in post-harvest handling of horticulture produce.
2. Explain maturity and harvesting indices of horticulture products.
3. Acquire skills on identifying factors for post-harvest losses in horticulture.
4. Perform managerial skills related to storage of horticulture products.
5. Demonstrate skills on packaging and forwarding horticulture products to market.

II. Syllabus: (Hours: Teaching: 50, Lab: 30, Training: 05, others incl. unit tests: 05)

(Syllabi of theory and practical together shall be completed in 80 hours)

Unit -1: Introduction to Post Harvest Technology (10h)

1. Importance of Postharvest Technology in horticultural crops; Pre-harvest factors affecting quality.
2. Maturity, types of maturity and factors affecting maturity of horticultural crops.
3. Maturity indices, harvesting, handling, grading of fruits- Mango, Banana, Papaya, Citrus and Guava.

Unit -2: Maturity and harvesting indices (10h)

1. Maturity indices, harvesting, handling, grading of:
 - (a) Vegetables - Tomato, Cabbage, Onion
 - (b) Cut flowers - Rose, *Chrysanthemum*, Tuberose
 - (c) Plantation crops - Coconut, Cashew nut, Coffee

Unit-3: Post-harvest problems and treatments (10h)

1. Factors responsible for deterioration of fruits, vegetables, cut flowers.
2. Physiological and bio-chemical changes during ripening; Hastening and delaying ripening process.
3. Postharvest treatments of horticultural crops –VHT, HWT, irradiation, fungicidal and chemical.

Unit-4: Storage of Horticulture products (10h)

1. Quality parameters and specification in fruits, vegetables and cut flowers.
2. Structure of fruits, vegetables and cut flowers related to physiological changes after harvest.
3. Methods of storage for local market and export.
4. Pre-harvest treatment and pre-cooling, pre-storage treatments.

Unit-5: Storage and packaging (10h)

1. Different systems of storage.
2. Packaging methods and types of packages, recent advances in packaging-vacuum packaging, poly shrink packaging, grape guard.
3. Types of containers and cushioning materials, packing treatments and cold storage; Modes of transport.

III. References:

1. Jacob John, P. 2008. A Handbook on Post Harvest management of Fruits and vegetables. Daya Publishing House, Delhi
2. Battacharjee, S. K. and De, L. C. 2005. Post-Harvest Technology of Flowers and Ornamentals Plants. Ponteer Publisher, Jaipur, India.
3. Neetu Sharma and Mashkoor Alam, M. 1998. Post-Harvest Diseases of Horticultural Perishables. International Book Distributing Co., Lucknow.
4. Saraswathy, S. et. al. 2008. Post-harvest Management of Horticultural Crops. Agribios (India).
5. Wiils, McGlasson and Graham, J. 2007. Post-Harvest- An Introduction to the Physiology and Handling of Fruits, Vegetables and ornamentals. Cab International

IV. Co-Curricular Activities (student field training by teacher: 05 hours):

a) Mandatory:

1. **For Teacher:** Training of students by the teacher in the classroom or in the laboratory for a total of not less than 10 hours on maturity indices of horticulture products, reaping and post-harvest handling, modern methods in storage.
2. **For Student:** Individual laboratory work and visit to Dept. of PHT in a Horticulture University/college; store houses of horticulture products, studying post-harvest practices – grading, treatments, storage methods etc., culminating writing and submission of a hand-written Field Work Report (various horticulture crops, harvesting methods, storage practices, packaging and transport) not exceeding 10 pages in the given method or format.
3. Max marks for Field Work Report: 05
4. Suggested Format for Field work Report (*not exceeding 10 pages*): Title page with student details, index page, objective, stepwise work done, findings, conclusions and acknowledgements.
5. Unit tests (IE).

b) Suggested Co-Curricular Activities:

1. Training of students by related industrial experts.
2. Assignments (including technical assignments like harvesting practices, maturity indices, causes of spoilage, storage structures and practices, packaging, transport and marketing).
3. Seminars, Group discussions, Quiz, Debates etc. (on related topics).
4. Preparation of videos on PHT of different horticulture products; harvesting and grading, storage methods.
5. Collection of material/figures/photos related to PHT practices of horticulture products in India and abroad, writing and organizing them in a systematic way in a file.
6. Visits to protected cultivation facilities in a Horticulture University or college and/or storage units.
7. Invited lectures and presentations on related topics by field/industrial expert

BOT - 147

GOVERNMENT COLLEGE (AUTONOMOUS), RAJAHMUNDRY III B.Voc, – HORTICULTURE / V Semester End (w.e.f2022-23)

Core Course 10B: Post-harvest Management of Horticultural Crops – Practical syllabus

Learning Outcomes: On successful completion of this practical course, student will Be able to:

1. Identify the maturity and harvesting indices of horticulture products.
2. Perform various skills related to manual and mechanical grading of horticulture products.
3. Identify causes for losses of horticulture products in store houses.
4. Demonstrate skills on packaging and transport of horticulture products.

Practical (Laboratory) Syllabus: (30 hrs)

1. Study of maturity indices of fruits, vegetables, flowers and plantation crops.
2. Determination of physiological loss in weight and quality
3. Grading of horticultural produce (manual and mechanical).
4. Post-harvest treatment of horticultural crops, physical and chemical methods.
5. Identification of pests and diseases of Horticulture products in storage.
6. Study of post-harvest disorders in horticultural produce.
7. Study of facilities of storage units and methods of storage.
8. Packaging in fruits, vegetables by using different packaging materials
9. Packaging in plantation crops and cut flowers by using different packaging materials.

BOT -134
GOVERNMENT COLLEGE (AUTONOMOUS), RAJAHMUNDRY
III year B.Voc. Program Examinations at Core Course – 10B
Core Course 10B: Post-harvest Management of Horticultural Crops
SECTION – A

Answer any FIVE questions. Each question carries 5 marks. 5 x 4 = 20 M

1. Importance of post-harvest technology in horticultural crops
2. Handling and grading of cashew nut
3. Factors responsible for deterioration of cut flowers
4. Quality parameters and specification fruits
5. Vacuum package
6. Poly shrink packaging
7. Pre-storage treatments of horticulture products
8. Maturity indices and harvesting of tomato

SECTION – B

Answer any THREE of the following. Each question carries 10 marks. 3 x 10 = 30M

9. Explain different pre-harvest factors affecting quality of horticultural products.
10. Describe about maturity indices, harvesting, handling and grading of rose flowers.
11. Explain about physiological and biochemical changes during ripening of horticultural Products.
- 12 Write an essay on fungicidal and chemical treatment of horticultural products after Harvest.
13. Describe the structure of fruits and vegetables related to physiological changes after Harvest.
14. Describe the methods of packaging and types of packages used for horticultural Crops.

BOT -134
GOVERNMENT COLLEGE (AUTONOMOUS), RAJAHMUNDRY

Blue Print

Unit no. / Title	SAQ	LAQ	Marks allotted to the Module
Unit - 1/ Introduction to Post Harvest Technology	1	1	14
Unit - 2/ Maturity and harvesting indices	1	1	14
Unit - 3/ Post-harvest problems and treatments	2	2	28
Unit - 4/ Storage of Horticulture products	2	1	18
Unit - 5/ Storage and packaging	2	1	18
Total marks allotted to all questions including choice =	08	06	92

Note: Question paper setters are requested to adhere strictly to the above blue Print while preparing the said paper

Model Question Paper Pattern for Practical Examination

Semester – V/ Horticulture Skill Enhancement Course 10B

Post-harvest Management of Horticultural Crops

Max. Time: 3 Hrs.

Max. Marks: 50

1. Determination of maturity and harvesting indices of two horticulture products 'A' 8
2. Grading practice of any two horticulture products 'B' 10
3. Identifying a pest and a disease of horticulture product 'C' 12
4. Scientific observation and data analysis 4 x 3 = 12
 - D. Maturity/harvest index of fruit/vegetable crop
 - E. Maturity/harvest index of flower/plantation crop
 - F. Post- harvest disorder/pest/disease of a horticulture crop
 - G. Packaging material/ practice
5. Record + Viva-voce 5+3 = 8

Core Course 9C: Water Management in Horticultural Crops

I. Learning Outcomes:

Students at the successful completion of the course will be able to:

1. Understand the importance of water for horticulture crops.
2. Explain different irrigation practices and factors influencing them.
3. Acquire skills on layout of sprinkler and drip irrigation.
4. Perform managerial skills related to water management in horticultural crop fields.
5. Demonstrate skills on efficient use of irrigation methods for different types of soils.

II. Syllabus: (Hours: Teaching: 50, Lab: 30, Training: 05, others incl. unit tests: 05)

(Syllabi of theory and practical together shall be completed in 80 hours)

Unit -1: Importance of water for plants (10h)

1. Importance of water to plants, hydrological cycle; water resources in Andhra Pradesh and India.
2. Area of different crops under irrigation; function of water for plant growth.
3. Effect of moisture stress on crop growth; Available and unavailable soil moisture – distribution of soil moisture.
4. Water budgeting – kinds of water- rooting characteristics – moisture extraction pattern.

Unit -2: Water for horticultural crops (10h)

1. Water requirement of horticultural crops – net irrigation requirement, gross irrigation requirement.
2. Lysimeter studies, Plant water potential climatological approach – use of pan evaporimeter- Consumptive use of pan evaporimeter.
3. Definition of evaporation, transpiration, evapo-transpiration and potential evapo-transpiration.

Unit-3: Irrigation methods (10h)

1. Factor for crop growth stages – critical stages of crop growth for irrigation; irrigation scheduling – different approaches.
2. Soils quality of irrigation water, irrigation management practices for different soils and crops.
3. Methods of Irrigation- classification, border, check basin, Square and ring basin, furrow irrigation methods.

Unit-4: Modern methods of irrigation (10h)

1. Sub-surface pressurized methods; sprinkler- definition, adoptability, limitations.
2. Components and types of sprinkle irrigation system, layout, fertilizer applicator.
3. Drip irrigation system – definition, advantages, dis- advantages, components, fertilizer applicator, and layout.

Unit-5: Water management (10h)

1. Water management problem, merits and demerits; Water use efficiency (WUE), factors effecting WUE.
2. Methods to improve economic use of water for irrigation.
3. Water use for maximum profit of garden/orchard ecosystem; water management for problem soils.

III. References:

1. Y P Rao and S. R. Bhakar, 2008. Irrigatin Technology Theory & Practices AgroTech Publishing Academy, Udaipur
2. A.M. Michael, 2002. Irrigation Theory and Practice. Vikas Publishing House Pvt. Ltd. New Delhi.
3. R.K. Shivanappan Drip Irrigation Keerthi Publishing House Pvt. Ltd., Coimbatore.
4. A.M. Michael and T.P. Ojha, 1999. Principles of Agricultural Engineering Vol-II, Jain Brothers, New Delhi

IV. Co-Curricular Activities (student field training by teacher: 05 hours):

c) Mandatory:

1. **For Teacher:** Training of students by the teacher in the classroom or in the laboratory for a total of not less than 10 hours on determination of water potential and soil moisture, various irrigation practices, equipment for sprinkler and drip irrigation methods etc.
2. **For Student:** Individual laboratory work and visit to drip and sprinkler irrigation installation in a Horticulture University/ college and/or horticulture crop field, studying the layout and

equipment, operation methods, irrigation schedule, fertigation, cleaning; culminating writing and submission of a hand-written Field Work Report (various crop plants, yield, economics) not exceeding 10 pages in the given method or format.

3. Max marks for Field Work Report: 05
4. Suggested Format for Field work Report (*not exceeding 10 pages*): Title page with student details, index page, objective, stepwise work done, findings, conclusions and acknowledgements.
5. Unit tests (IE).

d) Suggested Co-Curricular Activities

1. Training of students by related industrial experts.
2. Assignments (including technical assignments like determination of plant water requirements, transpiration in crops and use of anti-transpirants, traditional and modern methods of irrigation).
3. Seminars, Group discussions, Quiz, Debates etc. (on related topics).
4. Preparation of videos on irrigation methods and water management in horticulture crops.
5. Collection of material/figures/photos related to water management for horticulture crops in India and abroad, writing and organizing them in a systematic way in a file.
6. Visits to irrigation facilities in a Horticulture University or college and/or crop field.
7. Invited lectures and presentations on related topics by field/industrial experts

BOT - 147

GOVERNMENT COLLEGE (AUTONOMOUS), RAJAHMUNDRY

III B.Voc. - HORTICULTURE / V Semester End (w.e.f2022-23)

Core Course 9C: Water Management in Horticultural Crops

Practical syllabus

Learning Outcomes: On successful completion of this practical course, student will Be able to:

1. Determine water requirement of a crop plant.
2. Perform skills related to determination of soil moisture constants.
3. Operate equipment of sprinkler and drip irrigation.
4. Make layouts for different irrigation methods.

Practical (Laboratory) Syllabus: (30 hrs)

1. Determination of water potential.
2. Estimation of soil moisture constants.
3. Determination of soil moisture by air oven method.
4. Estimation of irrigation efficiency of horticultural crops.
5. Estimation of water requirements of horticultural crops.
6. Collection of field data for designing micro-irrigation system for orchard and vegetable crops.
7. Study of different components of drip irrigation system.
8. Study of different components of sprinkler irrigation system.
9. Study of fertilizer application system.

BOT - 147
GOVERNMENT COLLEGE (AUTONOMOUS), RAJAHMUNDRY
III B.Voc., - HORTICULTURE / V Semester End (w.e.f2022-23)
Core Course 9C: Water Management in Horticultural Crops
SECTION – A

Answer any FIVE questions. Each question carries 5 marks. 5 x 4 = 20 M

1. Importance of water to plants
2. Net irrigation requirement
3. Consumptive use of pan evaporimeter
4. Irrigation management practices for different soils
5. fertilizer applicator
6. Sub-surface pressurized methods
7. Water use efficiency
8. Orchard ecosystem

SECTION – B

Answer any THREE of the following. Each question carries 10 marks. 3 x 10 = 30M

9. Write an essay on Water budgeting.
10. Write an essay on effect of moisture stress on crop growth.
11. Discuss the plant water potential climatological approach
12. Describe the methods of Irrigation
13. Write an essay on components and types of sprinkle irrigation system
14. Discuss the Water management problem and write a notes on merits and Demerits.

BOT -134

GOVERNMENT COLLEGE (AUTONOMOUS), RAJAHMUNDRY

Blue Print

Unit no./ Title	SAQ	LAQ	Marks allotted to the Module
Unit - 1/ Importance of water for plants	1	2	24
Unit - 2/ Water for horticultural crops	1	1	14
Unit - 3/ Irrigation methods	2	1	18
Unit - 4/ Modern methods of irrigation	2	1	18
Unit - 5/ Water management	2	1	18
Total marks allotted to all questions including choice =	08	06	92

Note: Question paper setters are requested to adhere strictly to the above blue Print while preparing the said paper

Model Question Paper Pattern for Practical Examination
Semester – V/ B.Voc Horticulture Skill Enhancement Core Course 9C
Water Management in Horticultural Crops

Max. Time: 3 Hrs.

Max. Marks: 50

- | | |
|---|------------|
| 1. Determination of water potential/soil moisture 'A' | 8 |
| 2. Estimation of irrigation efficiency of a horticulture crop 'B' | 10 |
| 3. Making a layout for sprinkler/drip irrigation system 'C' | 12 |
| 4. Scientific observation and data analysis | 4 x 3 = 12 |
| D. Component for sprinkler irrigation system. | |
| E. Component for drip irrigation system. | |
| F. Soil moisture constant | |
| G. Fertigation method in modern irrigation | |
| 5. Record + Viva-voce | 5+3 = 8 |

BOT - 147

GOVERNMENT COLLEGE (AUTONOMOUS), RAJAHMUNDRY

III B.Voc., – HORTICULTURE / V Semester End (w.e.f.2022-23)

Core Course 10C: Soil Fertility and Nutrient Management

I. Learning Outcomes:

Students at the successful completion of the course will be able to:

1. Understand the role of macro and micro nutrients in plant nutrition.
2. Explain different types of manures, chemical and bio fertilizers used for horticulture plants.
3. Acquire skills on nutrient deficiency symptoms and status of nutrients in plants.
4. Perform managerial skills related to integrated nutrient management in horticultural crop fields.
5. Demonstrate skills on efficient use of fertilizers for different types of horticulture crops.

II. Syllabus: (Hours: Teaching: 50, Lab: 30, Training: 05, others incl. unit tests: 05)

(Syllabi of theory and practical together shall be completed in 80 hours)

Unit -1: Introduction to Soil fertility and soil productivity (10h)

1. History of soil fertility, definition of soil fertility and productivity; essential nutrient elements and functions, deficiency symptoms.
2. Mechanism of Nutrient transport / uptake to plants and nutrient availability.
3. Acid, calcareous and salt affected soil characteristics and management

Unit -2: Soil organic matter (10h)

1. Role of micro-organisms in organic matter decomposition and humus formation.
2. Importance of C: N ratio and pH in plant nutrition soil buffering capacity.
3. Main objectives of INM, components of Integrated plant nutrient management (IPNM); soil fertility evaluation methods: chemical, biological and by visual symptoms, critical levels of different nutrients and hidden hunger in soil.
4. DRIS Approach, critical limit approach,

Unit-3: Manures and fertilizers (10h)

1. Manures and fertilizer classification and manufacturing process; properties and fate of major and micronutrient in soils.
2. NPK fertilizers: composition and application methodology, luxury consumption, nutrient reactions, deficiency symptom by visual diagnosis.
3. Secondary and Micronutrient fertilizers their types, composition, reaction in soil and effect on crop growth.
4. Time and methods of manures and fertilizers application; foliar application and its concept.

Unit-4: Modern methods of irrigation (10h)

1. Fertilizer control order; nutrient interactions, plant nutrient toxicity symptoms and remedial measures.
2. Effect of potential toxic elements in soil and plant.
3. Soil test crop response and targeted yield concept.

Unit-5: Water management (10h)

1. Biofertilizers: importance, types and use in horticultural crop.
2. Nutrients use efficiency (NUE) and management.
3. Use of vermicompost and residue wastes in crops.

III. References:

1. Mengel , et al., 2001. Principles of Plant Nutrition (5th Edition), Springer.
2. Yawalkar K.S, Agarwal J. P. and Bokkde, 1992. Manures and Fertilizers. Agri. Horticultural Publishing House, Nagpur.
3. Tandan HLS, 1994. Fertilizers Guide. Fertilizers Development Consultation Organizations, New Delhi.
4. Seethramaan, S. Biswas, B.C. Maheshwari, S. and Yadav, D.S. 1986 Hand Book on Fertilizers Technology. The Fertilizers Association of India, New Delhi.

IV. Co-Curricular Activities (student field training by teacher: 05 hours):

e) Mandatory:

1. **For Teacher:** Training of students by the teacher in the classroom or in the laboratory for a total of not less than 10 hours on determination of macro and micro-nutrients in plants and soil, identification of nutrient deficiencies in plants, application of manures, chemical and bio fertilizers and INM and IPNM etc.
2. **For Student:** Individual laboratory work and visit to a Horticulture University/ college, soil testing laboratory, and/or horticulture crop field, studying the plant-nutrient deficiencies, fertilizer application methods; equipment in a soil testing laboratory, their operation and methodology of nutrient estimation; culminating writing and submission of a hand-written Field Work Report (various crop plants, yield, economics) not exceeding 10 pages in the given method or format.
3. Max marks for Field Work Report: 05
4. Suggested Format for Field work Report (*not exceeding 10 pages*): Title page with student details, index page, objective, stepwise work done, findings, conclusions and acknowledgements.
5. Unit tests (IE).

f) Suggested Co-Curricular Activities

1. Training of students by related industrial experts.
2. Assignments (including technical assignments like identification of plant nutrient deficiencies, estimating nutrients in soils, determination of plant nutrient requirements, natural and commercial manures, chemical and bio fertilizers and their application, traditional and modern methods of fertilizer application).
3. Seminars, Group discussions, Quiz, Debates etc. (on related topics).
4. Preparation of videos on methods and management practices for horticulture crops in INM and IPNM.
5. Collection of material/figures/photos related to plant nutrition management for horticulture crops in India and abroad, writing and organizing them in a systematic way in a file.
6. Visits to irrigation facilities in a Horticulture University or college and/or crop field; soil testing laboratory.
7. Invited lectures and presentations on related topics by field/industrial experts

GOVERNMENT COLLEGE (AUTONOMOUS), RAJAHMUNDRY

III B.Voc., – HORTICULTURE / V Semester End (w.e.f2022-23)

Core Course 10C: Soil Fertility and Nutrient Management

Practical syllabus

Learning Outcomes: On successful completion of this practical course, student will Be able to:

1. Diagnose nutrient deficiencies in plants.
2. Estimate organic matter, major and minor nutrients in soil.
3. Determine the adulteration of fertilizers.
4. Perform skills related to INM and IPNM.
5. Perform skills related to application of soil amendments.

Practical (Laboratory) Syllabus: (30 hrs)

1. Determination of organic matter (Organic carbon) in soil and interpretations.
2. Determination of available Nitrogen in soil and interpretations.
3. Determination of available P in soil and interpretations.
4. Determination of available K in soil and interpretations.
5. Determination of available S in soil and interpretations.
6. Determination of exchangeable Calcium and Magnesium by Versenate (EDTA) Method.
7. Determination of soil Micronutrients
8. Fertilizer Adulteration test / Identification of Adulteration in fertilizer / Detection of adulteration in fertilizers (Rapid test)
9. Determination of Gypsum requirement of saline and alkali soils.
10. Determination of Lime requirement of acid soils.

BOT - 147
GOVERNMENT COLLEGE (AUTONOMOUS), RAJAHMUNDRY
III B.Voc., – HORTICULTURE / V Semester End (w.e.f2022-23)
Core Course 10C: Soil Fertility and Nutrient Management
SECTION – A

Answer any FIVE questions. Each question carries 5 marks. 5 x 4 = 20 M

1. Soil fertility
2. Humus formation
3. Fertilizer classification
4. Micronutrients in soil
5. Soil test
6. Targeted yield concept
7. Uses of vermicompost
8. Residue wastes in crop

SECTION – B

Answer any THREE of the following. Each question carries 10 marks 3 x 10 = 30 M

9. Write an essay on mechanism of nutrient transport.
10. Discuss the role of micro-organisms in organic matter decomposition
11. Describe NPK fertilizer composition and application methodology.
12. Write an essay effect of potential toxic elements in soil and plant.
13. Discuss the importance, types and use of bio-fertilizers in horticulture.
14. Describe Nutrients Use Efficiency (NUE) and management.

BOT -134

GOVERNMENT COLLEGE (AUTONOMOUS), RAJAHMUNDRY

Blue Print

Unit no. / Title	SAQ	LAQ	Marks allotted to the Module
Unit - 1/ Introduction to Soil fertility and soil productivity	1	1	14
Unit - 2/ Soil organic matter	1	1	14
Unit - 3/ Manures and fertilizers	2	1	18
Unit - 4/ Modern methods of irrigation	2	1	18
Unit - 5/ Water management	2	2	28
Total marks allotted to all questions including choice =	08	06	92

Note: Question paper setters are requested to adhere strictly to the above blue Print while preparing the said paper

Model Question Paper Pattern for Practical Examination
Semester – V/ B.Voc Horticulture Skill Enhancement Core Course 10C
Soil Fertility and Nutrient Management

Max. Time: 3 Hrs.

Max. Marks: 50

- | | |
|---|------------|
| 1. Determination of organic matter, Nitrogen/Phosphorus/ Potassium/Sulphur in a soil sample 'A' | 8 |
| 2. Determination of exchangeable Ca-Mg/soil micronutrients 'B' | 10 |
| 3. Determination of Gypsum or lime requirement/ fertilizer adulterations 'C' | 12 |
| 4. Scientific observation and data analysis | 4 x 3 = 12 |
| D. Plant nutrient deficiency symptom | |
| E. Manure/chemical fertilizer | |
| F. Biofertilizer | |
| G. Fertigation method in INM/IPNM | |
| 5. Record + Viva-voce | 5 + 3 = 8 |

Core Course 9D: Dry land Horticulture

I. Learning Outcomes:

Students at the successful completion of the course will be able to:

1. Understand the basic concepts of dryland horticulture and its prospects.
2. Acquire skills in relation to management of soil and water in dryland farming.
3. Demonstrate skills on various methods to check the water loss during farming.
4. Understand the cultivation practices of certain crops suitable for dryland farming.

II. Syllabus: (Hours: Teaching: 50, Lab: 30, Training: 05, others incl. unit tests: 05)

(Syllabi of theory and practical together shall be completed in 80 hours)

Unit -1: Introduction to Dryland horticulture (10h)

1. Definition, importance and limitation of dry land horticulture.
2. Present status and future scope. Constraints encounter in dry lands.
3. Agro-climatic features in rain shadow areas, scarce water resources, high temperature, soil erosion, run-off losses etc.

Unit -2: Soil and water management (10h)

1. **Techniques and management of dry land horticulture:** watershed development, soil and water conservation methods-terraces, contour bunds, etc.
2. **Methods of control and impounding of run-off water-farm ponds, trenches, macro catch pits,etc.**
3. *In-situ* water harvesting methods, micro catchment, different types of tree basins etc.

Unit-3: Methods for efficient water use (10h)

1. **Methods of reducing evapotranspiration,** use of shelter belts, mulches, antitranspirants, and growth regulators, etc.
2. Water use efficiency-need based, economic and conjunctive use of water, Micro systems of irrigation etc. IFS concept and alternate land use systems.
3. ***In-situ* water harvesting methods, micro catchment, different types of tree basins etc.**

Unit-4: Modern methods of irrigation (10h)

1. Characters, special adaptation and cultivation practices of following horticultural crops:
(a)Ber (b) Annona (c) Pomegranate (d) Tamarind

Unit-5: Water management (10h)

1. Characters, special adaptation and cultivation practices of following horticultural crops:
(a) Fig (b) Wood apple (c) Marking nut (d) Carambola

III. References:

1. Chadha, K. L. (ICAR) 2002, 2001. Hand book of Horticulture. ICAR, New Delhi
2. Chundawat, B.S. 1990. Arid Fruit Culture. Oxford and IBH, New Delhi.
3. P.L. Taroj, B.B. Vashishtha, D.G.Dhandar. 2004. Advances in Arid Horticulture. Internal Book Distributing Co., Lucknow.
4. T. Pradeep Kumar, B. Suma, Jyothi Bhaskarand K.N.Sathesan. 2008. Management of Horticultural Crops. New India Publishing Agency.

IV. Co-Curricular Activities (student field training by teacher: 05 hours):

a) Mandatory:

1. **For Teacher:** Training of students by the teacher in the classroom or in the laboratory for a total of not less than 10 hours on watershed development, soil and water conservation methods, Micro systems of irrigation etc.
2. **For Student:** Individual laboratory work and visit to a Horticulture University/ college, sites of dryland farming, studying the water management, characteristics of plants grown in dryland areas, cultivation practices; culminating writing and submission of a hand-written Field Work Report (various crop plants, yield, economics) not exceeding 10 pages in the given method or format.
3. Max marks for Field Work Report: 05
4. Suggested Format for Field work Report (*not exceeding 10 pages*): Title page with student details, index page, objective, stepwise work done, findings, conclusions and acknowledgements.
5. Unit tests (IE).

b) Suggested Co-Curricular Activities

1. Training of students by related industrial experts.
2. Assignments (including technical assignments like water management practices in dryland areas, methods of controlling evapotranspiration, cultivation practices for plants grown in drylands etc.,).
3. Seminars, Group discussions, Quiz, Debates etc. (on related topics).
4. Preparation of videos on methods and management practices for horticulture crops in INM and IPNM.
5. Collection of material/figures/photos related to dryland horticulture crops in India and abroad, writing and organizing them in a systematic way in a file.
6. Visits to irrigation facilities in a Horticulture University or college and/or dryland crop fields.
7. Invited lectures and presentations on related topics by field/industrial experts.

BOT - 147

GOVERNMENT COLLEGE (AUTONOMOUS), RAJAHMUNDRY

III B.Voc., – HORTICULTURE / V Semester End (w.e.f2022-23)

Core Course 9D: Dry land Horticulture

Practical syllabus

Learning Outcomes: On successful completion of this practical course, student will Be able to:

1. Study the rainfall pattern and water deficit conditions in an area.
2. Perform skills on harvesting and conservation of rain water.
3. Identify the adaptation of plants to dryland areas.
4. Perform skills related to irrigation methods suitable to dryland areas.
5. Perform skills on checking evapo-transpiration.

Practical (Laboratory) Syllabus: (30 hrs)

1. Study of rainfall patterns.
2. Practicing contour bunding and trenching.
3. Studying micro catchments.
4. Studying soil erosion and its control in a dryland area.
5. Study of evapotranspiration and methods to control.
6. Practicing mulching methods.
7. Irrigation systems - Surface, Sub-surface; micro irrigation methods.
8. Study of special techniques of planting and aftercare in dry lands.
9. Study special horticultural practices in dry land plants.
10. Training and pruning in dry land plants.
11. Study of morphological and anatomical features of drought tolerant fruit crops.
12. Study of morphological and anatomical features of salinity tolerant fruit crops.

BOT - 147
GOVERNMENT COLLEGE (AUTONOMOUS), RAJAHMUNDRY
III B.Voc., – HORTICULTURE / V Semester End (w.e.f2022-23)
Core Course 9D: Dry land Horticulture

SECTION – A

Answer any FIVE questions. Each question carries 5 marks.

5 x 4 = 20 M

1. Soil erosion
2. Different types of tree basins
3. Anti-transpirants
4. Use of shelter belts
5. Special adaptation tamarind
6. Irrigation for ber
7. Characters of marking nut
8. Intercultural practices for fig

SECTION – B

Answer any THREE of the following. Each question carries 10 marks

3 x 10 = 30M

9. (a) Write an essay on present status and future scope of dry land horticulture.
10. (a) Discuss the techniques and management of dry land horticulture.
11. (a) Describe the IFS concept and alternate land use systems.
12. (a) Write an essay on cultivation practices of pomegranate.
13. Write an essay on cultivation practices of *Annona*.
14. (a) Discuss cultivation practices of wood apple.

BOT -134

GOVERNMENT COLLEGE (AUTONOMOUS), RAJAHMUNDRY

Blue Print

Unit no. / Title	SAQ	LAQ	Marks allotted to the Module
Unit - 1/ Introduction to Dryland horticulture	1	1	14
Unit - 2/ Soil and water management	1	1	14
Unit - 3/ Methods for efficient water use	2	1	18
Unit - 4/ Modern methods of irrigation	2	2	28
Unit - 5/ Water management	2	1	18
Total marks allotted to all questions including choice =	08	05	92

Note: Question paper setters are requested to adhere strictly to the above blue Print while preparing the said paper

Model Question Paper Pattern for Practical Examination

Semester – V/ B.Voc Horticulture Skill Enhancement Core Course: 9D

Core Course 9D: Dry Land Horticulture

Max. Time: 3 Hrs.

Max. Marks: 50

- | | |
|---|------------|
| 1. Demonstration of skills on studying rain fall/ contour bunding or trenching 'A' | 8 |
| 2. Demonstration of methods of controlling evapotranspiration/ layout of micro-irrigation systems 'B' | 10 |
| 3. Anatomical features of a drought or salinity tolerant plant 'C' | 12 |
| 4. Scientific observation and data analysis | 4 x 3 = 12 |
| D. Water harvesting method | |
| E. Soil erosion/control method | |
| F. Irrigation practice in dry land area. | |
| G. Morphological features of a plant adapted to dry land farming | |
| 5. Record + Viva-voce | 5 + 3 = 8 |

Core Course 10D: Plantation crops

I. Learning Outcomes:

Students at the successful completion of the course will be able to:

1. Understand the characteristics of plantation crops.
2. Realize the contribution of plantation crops in national economy.
3. Explain the soil and climatic requirements of some important plantation crops in India.
4. Demonstrate managerial skills on farming, reaping the products and post-harvest practices in relation to plantation crops.
5. Identify the physiological disorders, pests and diseases of plantation crops.

II. Syllabus: (Hours: Teaching: 50, Lab: 30, Training: 05, others incl. unit tests: 05)

(Syllabi of theory and practical together shall be completed in 80 hours)

Unit -1: Introduction to Plantation crops (10h)

6. Plantation crops: Definition, history and development, scope and importance; Differences between plantation and fruit crops
7. Area and production, export and import potential, role in national and state economy.
8. Important research stations on plantation and beverage crops and their role.

Unit -2: Oil yielding crops (10h)

1. Soil, climate requirements, varieties, propagation methods, cultivation practices, physiological disorders, pests, diseases and their management, post-harvest technology, yield and economics of:
(a) Coconut (b) Oil palm

Unit-3: Masticatory crops (10h)

2. Soil, climate requirements, varieties, propagation methods, cultivation practices, physiological disorders, pests, diseases and their management, post-harvest technology, yield and economics of:
(a) Areca nut (b) Betel vine

Unit-4: Beverage crops (10h)

1. Soil, climate requirements, varieties, propagation methods, cultivation practices, physiological disorders, pests, diseases and their management, post-harvest technology, yield and economics of:
(a) Coffee (b) Cacao

Unit-5: Nut and Industrial crops (10h)

3. Soil, climate requirements, varieties, propagation methods, cultivation practices, physiological disorders, pests, diseases and their management, post-harvest technology, yield and economics of:
(a) Cashew nut (b) Rubbe

III. References:

1. Chadha, K.L. (ICAR) 2002, 2001. Hand book of Horticulture. ICAR, New Delhi
2. Kumar, N.J.B. M. Md. Abdul Khaddar, RangaSwamy, P. and Irrulappan, I. 1997. Introduction to spices, Plantation crops and Aromatic plants. Oxford & IBH, New Delhi.
3. Meena, S.R. 2020. Production technology for fruit and plantation crops. TNAU, Coimbatore, WWW.agriyan.in

IV. Co-Curricular Activities (student field training by teacher: 05 hours):

c) Mandatory:

1. **For Teacher:** Training of students by the teacher in the classroom or in the laboratory for a total of not less than 10 hours on identification of varieties, propagation methods, physiological disorders, pests and diseases of plantation crops etc.
2. **For Student:** Individual laboratory work and visit to a Horticulture University/ college, fields of plantation crops, studying the cultivation practices; post-harvest methods, study of economics etc., culminating writing and submission of a hand-written Field Work Report (various crop plants, yield, economics) not exceeding 10 pages in the given method or format.
3. Max marks for Field Work Report: 05
4. Suggested Format for Field work Report (*not exceeding 10 pages*): Title page with student details, index page, objective, stepwise work done, findings, conclusions and acknowledgements.
5. Unit tests (IE).

d) Suggested Co-Curricular Activities

1. Training of students by related industrial experts.
2. Assignments (including technical assignments like traditional and modern methods of cultivation, water management, weed management, disease management etc., for important plantation crops in India).
3. Seminars, Group discussions, Quiz, Debates etc. (on related topics).
4. Preparation of videos on methods and management practices for plantation crops in INM and IPNM.
5. Collection of material/figures/photos related to plantation crops in India and abroad, writing and organizing them in a systematic way in a file.
6. Visits to irrigation facilities in a Horticulture University or college and/or plantation crop fields.
7. Invited lectures and presentations on related topics by field/industrial experts.

BOT - 147

GOVERNMENT COLLEGE (AUTONOMOUS), RAJAHMUNDRY III B.Voc, - HORTICULTURE / V Semester End (w.e.f2022-23)

Core Course 10D: Plantation crops Practical syllabus

Learning Outcomes: On successful completion of this practical course, student will Be able to:

1. Identify the plantation crops and their varieties.
2. Make layout of orchards of plantation crops.
3. Perform skills on propagation techniques of plantation crops.
4. Identify the physiological disorders of plantation crops.
5. Identify the pests and diseases of plantation crops.

Practical (Laboratory) Syllabus: (30 hrs)

1. Identification and description of plantation crops and their varieties.
2. Designing and making layout of orchards.
3. Propagation methods and nursery techniques of plantation crops.
4. Studying physiological disorders of plantation crops.
5. Studying pests of plantation crops.
6. Study of diseases of plantation crops
7. Preparation of plant bio regulators and their uses.
8. Tapping and processing of latex in rubber.
9. Study special horticultural practices in dry land plants.
10. Training and pruning in Plantation crops.
11. Study of morphological and anatomical features of plantation crops.
12. Study of morphological and anatomical features of plantation crops.

BOT - 147
GOVERNMENT COLLEGE (AUTONOMOUS), RAJAHMUNDRY
III B.Voc, - HORTICULTURE / V Semester End (w.e.f2022-23)
Core Course 10D: Plantation crops
SECTION – A

Answer any FIVE questions. Each question carries 5 marks.

5 x 4 = 20 M

1. Scope of plantation crops
2. Pests of coconut
3. Economic importance of betel vine
4. Climate requirements of areca nut
5. Physiological disorders in coffee
6. Post-harvest technology in cacao
7. Economic importance of cashew nut
8. Varieties of rubber plant

SECTION – B

Answer Any THREE of the following. Each question carries 10 marks.

3 x 10 = 30M

9. Write an essay on area and production of plantation crops.
10. Write an essay on cultivation practices of oil palm.
- 11 Write an essay on cultivation practices of coconut.
12. Write an essay on cultivation practices of betel vine.
13. Write an essay on cultivation practices of coffee.
14. Discuss cultivation practices of rubber.

BOT -134

GOVERNMENT COLLEGE (AUTONOMOUS), RAJAHMUNDRY

Blue Print

Unit no. / Title	SAQ	LAQ	Marks allotted to the Module
Unit - 1/Introduction to Plantation crops	1	1	14
Unit - 2/ Oil yielding crops	1	2	24
Unit - 3/ Masticatory crops	2	1	18
Unit - 4/ Beverage crops	2	1	18
Unit - 5/ Nut and Industrial crops	2	1	18
Total marks allotted to all questions including choice =	08	05	92

Note: Question paper setters are requested to adhere strictly to the above blue Print while preparing the said paper

Model Question Paper Pattern for Practical Examination
Semester – V/ B.Voc Horticulture Skill Enhancement Core Course: 10D
Plantation Crops

Max. Time: 3 Hrs.

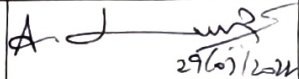

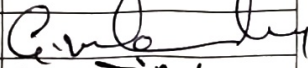

Max. Marks: 50

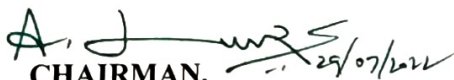
- | | |
|--|------------|
| 1. Making a layout of an orchard for a plantation crop 'A' | 8 |
| 2. Demonstration of a propagation technic of a given plantation crop 'B' | 10 |
| 3. Identification of Pests/diseases of a plantation crop 'C' | 12 |
| 4. Scientific observation and data analysis | 4 x 3 = 12 |
| D. Identification of variety of a plantation crop | |
| E. Propagation technic | |
| F. Physiological disorder/pest/disease | |
| G. Morphological/anatomical features of a plantation crop | |
| 5. Record + Viva-voce | 5 + 3 = 8 |

**GOVERNMENT COLLEGE (AUTONOMOUS), RAJAHMUNDRY
DEPARTMENT OF BOTANY**

BOARD OF STUDIES MEETING FOR B. Voc., (HORTICULTURE): 2022-23 A.Y.

The Board Of Studies Meeting for the courses of **B. Voc., (Horticulture)** is convened at Department of Botany, G.C. (A), Rajahmundry on **29-07-2022** by **02:00 PM** under the Chairmanship of Dr. A. Srinivasa Rao with the following members.

S.No.	Designation	Name	Signature
1.	Chairman	Dr. A. Srinivasa Rao Lecturer in-Charge, Department of Botany	 29/07/2022
2.	University Nominee	Dr. A. Matta Reddy, Associate Professor, ANUR, Rajahmundry	
3.	Subject Expert	Dr. M. Kalpana, Professor, Dr. Y.S.R.H.U, Venkataramanna Gudem.	Attended online
4.	Subject Expert	Dr. Ch. Srinivasa Reddy, Lecturer in Botany, SRR & CVR GDC, Vijayawada	Ch Srinivasa Reddy
5.	Industrial Nominee	Dr. P. Rama Krishna, Director, Sri Satyadeva Nursery, Kadiapulanka.	not attended
6.	Faculty Member	G. Vivekananda Swamy, Lecturer	
7.	Faculty Member	B. Bujji Babu, Lecturer	
8.	Student Nominee	Prathi Ushasri, B.Voc. (Horti.)	
9.	Student Nominee	Nandivada Suresh Kumar, B.Voc. (Horti.)	


CHAIRMAN,
BOARD OF STUDIES
&
Lecturer in-Charge
DEPARTMENT OF BOTAN
GOVERNMENT COLLEGE (
RAJAMAHENDRAVARAM-533 103.

BOARD OF STUDIES MEETING FOR B. Voc., (HORTICULTURE): 2022-23 A.Y.

The Board Of Studies Meeting for the courses of **B. Voc., (Horticulture)** is convened at Department of Botany, G.C. (A), Rajahmundry on **29-07-2022** by **02:00 PM** under the Chairmanship of Dr. A. Srinivasa Rao, Lecturer In-Charge of the department.

Agenda:

1. Program wise Curriculum Design for all the Semesters
2. Designing of Course Outcomes and Course Objectives
3. Identification of unit wise assignment questions and relevant model question paper.
4. Identifying /inclusion of components of Skill Development, Employability and Entrepreneurship in the course content and specific activity proposed.
5. Additional inputs into the curriculum
6. Designing Model Question Papers and identifying potential paper setters
7. Innovative Teaching - Learning Methodology (Learner Centric)
8. Academic activities of the Department such as seminars, fieldworks etc.
9. Any other proposal with the permission of the chair

Minutes of the Meeting:

Agenda point 1: Program wise Curriculum Design for all the Semesters

Discussion: The members discussed the curricular design of the B.Voc., (Horticulture) programme with two core courses of Horticulture in each semester to impart in depth skill based knowledge.

Resolution: The design of the programme as well as courses offered in all the semesters (I to V) are unanimously agreed by all the members of the BOS concerned.

Agenda point 2: Designing of Course Outcomes and Course Objectives

Discussion: The members who attended the meeting have gone through the course outcomes and course objectives related to the Horticulture core courses pertaining to all the semesters and discussed in detail.

Resolution: The outcomes and objectives written as per the Bloom's taxonomy are well appreciated and accepted unanimously.

Agenda point 3: Identification of unit wise assignment questions and relevant model question paper.

Discussion: Members who attended the meeting have read the assignment questions and discussed their relevance to the course curriculum with the teachers dealing with the said core courses.

Resolution: The assignment questions given for each course are accepted by the BOS members.

Dr.
Dr. Srinivasa Reddy
[Signature]
[Signature]

Agenda point 4: Identifying /inclusion of components of Skill Development, Employability and Entrepreneurship in the course content and specific activity proposed.

Discussion: As the Horticulture is a skill based subject. Moreover, the students pursuing the programme have to compete with the students from Horticulture Colleges affiliated to ICAR for vertical mobility, employment and entrepreneurship. Hence a dire need is felt to impart more skill based trainings to the students.

Resolution: The committee unanimously resolved to train the students by inviting experts in the domain subject and by conducting skill based trainings and field visits to horticulture firms in public and private sectors.

Agenda point 5: Additional inputs into the curriculum

Discussion: The additional inputs kept in the curriculum in the form of co-curricular and outreach programmes are well appreciated by all the members of BOS.

Resolution: All the additional inputs related to core subject are accepted by the BOS members.

Agenda point 6: Designing Model Question Papers and identifying potential paper setters

Discussion: The members of BOS gone through the model question papers of all the courses and proposed names of question papers setters and evaluators and discussed the relevance and competencies.

Resolution: The model question papers, names of question paper setters and evaluators are unanimously accepted by the members of BOS.

Agenda point 7: Innovative Teaching - Learning Methodology (Learner Centric)

Discussion: As the Horticulture is a skill based subject, all the students pursuing the programme should have field based knowledge and have to do more case studies related to horticulture crops to get a thorough skills in the domain area. Hence all the members felt the need of internships for the students in horticulture nurseries, crop fields and industries.

Resolution: It is unanimously resolved to impart skill based trainings to students in consultation with higher authorities and by linkages and collaborations with the horticulture based firms and industries.

Agenda point 8: Academic activities of the Department such as seminars, fieldworks etc.

Discussion: The members who have attended the BOS meeting discussed the annual action plan prepared by the department and the activities planned. The members felt the importance of tours and industrial visits to get an exposure to recent trends in the domain area.

Resolution: It is unanimously resolved to conduct one tour/field trip to Horticulture university/college/research institute and also an industry in both the semesters of an Academic Year.

Am
Ch. Srinivasa Reddy
G. Srinivasulu
S. Srinivasulu