A.S.D GOVT DEGREE COLLEGE FOR WOMEN (A)

(Re-Accredited by NAAC with 'B')

KAKINADA 533002, EASTGODAVARI, ANDHRA PRADESH

HORTICULTURE SYLLABUS

2021 – 2022

DEPARTMENT OF HORTICULTURE

A.S.D GOVT DEGREE COLLEGE FOR WOMEN (A)

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KAKINADA 533002 EASTGODAVARI, ANDHRA PRADESH

DEPARTMENT OF HORTICULTURE BOS 2021-2022

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
Sem.-II	2	Plant Propagation and Nursery Management	4	4	25	75	100
		Practical - 2	2	1	-	50	50
Apprentice/On Job Training for 02 months							
SECOND YEAR							
Sem.-III	3	Basics of Vegetable Science	4	4	25	75	100
		Practical - 3	2	1	-	50	50
Sem.-IV	4	Basics of Fruit Science	4	4	25	75	100
		Practical - 4	2	1	-	50	50
	5	Pests and diseases of horticulture plants and their management	4	4	25	75	100
		Practical - 5	2	1	-	50	50
Apprentice/On Job Training for 02 months							

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KAKINADA 533002 EASTGODAVARI, ANDHRA PRADESH

I B.Sc HORTICULTURE THEORY SYLLABUS for the Academic Year 2021-2022

SEMESTER - I, COURSE – I

FUNDAMENTALS OF HORTICULTURE AND SOIL SCIENCE

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.

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SEMESTER - I, COURSE – I

FUNDAMENTALS OF HORTICULTURE AND SOIL SCIENCE

Course Outcomes : On successful completion of this course, the students shall be able to :

- Make a layout of an orchard in a given area.
- Use various tools and implements to raise nursery and cultivate a horticulture crop.
- Prepare fertilizer mixtures and PGRs for plants.

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.

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I B.Sc HORTICULTURE THEORY SYLLABUS for the Academic Year 2021-2022

SEMESTER - II, COURSE – II

PLANT PROPAGATION AND NURSERY MANAGEMENT

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 andquality 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*, trifoliate 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. Apomixis : 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.

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

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I B.Sc HORTICULTURE PRACTICAL SYLLABUS for the Academic Year 2021-2022

SEMESTER - II, COURSE – II

PLANT PROPAGATION AND NURSERY MANAGEMENT

Course outcomes : On successful completion of this course, the students shall be able to :

- Practice a suitable propagation method for a given horticulture plant species.
- Perform skills to remove dormancy in seeds and other propagules of horticulture plants.
- Prepare media to raise nursery and to cultivate various horticulture plants.
- Demonstrate skill of various vegetative propagation technics used in Horticulture

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.

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II B.Sc HORTICULTURE THEORY SYLLABUS for the Academic Year 2021-2022

SEMESTER - III, COURSE – III

BASICS OF VEGETABLE SCIENCE (OLERICULTURE)

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 productionand 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 andyield of following crops:

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

Unit – 3 : Root and Tuber Crops **16 Hrs.**

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

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

Unit – 4 : Cole Crops **08 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*

Text books :

- **Bose T K et al. (2003)** Vegetable crops, Naya Udhyog 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

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SEMESTER - III, COURSE – III

BASICS OF VEGETABLE SCIENCE (OLERICULTURE)

Course outcomes : On successful completion of this course, the students shall be able to:

- Perform various tests for seed germination, viability and vigour.
- Make observations and record data on various growth stages of a given vegetable plant.
- Identify the pathogens and suggest control measures for diseases of vegetable crops.
- Practice suitable irrigation and fertigation methods for various horticulture crops.

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.

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II B.Sc HORTICULTURE THEORY SYLLABUS for the Academic Year 2021-2022

SEMESTER - IV, COURSE – IV

BASICS OF FRUIT SCIENCE (POMOLOGY)

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

- Realize the value of fruits in terms of human nutrition and economy of nation.
- Explain the potential fruit zones in various states of our country.
- Classify the fruiting plants based on temperature requirements.
- Acquire knowledge related to various cultivation practices for different fruit crops
- Demonstrate the special intercultural operations done in fruit crops
- Comprehend the knowledge on varieties of different fruit crops.
- Examine the pests and diseases of fruit crops and develop skills to manage the same,
- Explain about Integrated Orchard Management
- Develop knowledge on various entrepreneurial skills related to fruit science.

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

1. Importance of fruit growing in India and Andhra Pradesh.
2. Nutritive value of fruits.
3. Area and production of India and Andhra Pradesh.
4. Export and import potential of fruits in India. Constraints in fruit production and remediesto overcome them.

Unit – 2 : Tropical Fruit Crops **12 Hrs.**

Origin, history, distribution, area and production, uses and composition, varieties,soil and climatic requirements, propagation, planting, training and pruning, manuring and fertilizer application, irrigation, intercropping, harvesting and yield,diseases and pests of the following tropical fruit crops:

(a) Mango (b) Guava and (c) Papaya

Unit – 3 : Sub-tropical and Temperate Fruit Crops 12 Hrs.

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

(a) Grapes (b) Pomegranate (c) Citrus and (d) Apple

Unit – 4 : Arid and Minor Fruit crops 12 Hrs.

Origin, history, distribution, area and production, uses and composition, varieties, soil and climatic requirements, propagation, planting, training and pruning, manuring and fertilizer application, irrigation, inter cropping, harvesting and yield,diseases and pests of the following arid fruit crops:

(a) Amla (b) Dates and (c) Wood apple

Unit – 5 : Management Practices for Fruit Crops 12 Hrs.

1. Sustainable Production Practices for Local Fruit Production.
2. Integrated Orchard Management/Principles of IPM.
3. Harvesting and Labor Concerns
4. Grading, packing, storage and marketing of fruits.

Text books :

- **Chattopadhyay, T.K. 1997.** Text book on Pomology (Fundamentals of fruit growing),Kalyani Publishers, Hyderabad.
- **Chundawat, B.S. 1990.** Arid Fruit Culture, Oxford and IBH, New Delhi.
- **Gourley J H 2009.** Text book of Pomology, Read Books Publ., Canada

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SEMESTER - IV, COURSE – IV

BASICS OF FRUIT SCIENCE (POMOLOGY)

Course Outcomes : On successful completion of this course, the students shall be able to :

- Identify different varieties of tropical, sub-tropical and temperate fruit crops.
- Estimate and apply required dosage of fertilizer/manure/biofertilizer for a fruit crop.
- Use required PGR to check the leaf fall, flower fall and fruit fall in a crop species.
- Identify pest and diseases of various fruit crops and suggest control measures.

1. Study of varieties of Mango, Papaya and Guava.
2. Study of varieties of Grape, Pomegranate, Citrus and Apple.
3. Study of varieties of Amla, Dates and Wood apple.
4. Manure and fertilizer application including Biofertilizers in different fruit crops.
5. Methods of application, calculation of the required quantity of manure andfertilizers based on the nutrient content.
6. Use of growth regulators in Fruit crops.
7. Identification and collection of important pests in fruit crops.
8. Identification and collection of important diseases in fruit crops and herbariumpreparation.
9. Visit to a local fruit market/commercial Orchard.

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SEMESTER - IV, COURSE – V

PESTS AND DISEASES OF HORTICULTURE PLANTS AND THEIRMANAGEMENT

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 nematicides.
4. Preparation of fungicidal solutions, slurries, pastes and their application.

Text books :

- **Verma L R and R C Sharma 1999.** Diseases of Horticultural Crops – Fruits, IndusPublishing, New Delhi.
- Diseses 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

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SEMESTER - IV, COURSE – V

PESTS AND DISEASES OF HORTICULTURE PLANTS AND THEIRMANAGEMENT

Course Outcomes : On successful completion this course, the students shall be able to :

- Identify the insect pests and microbial pathogens on various horticulture plants.
- Identify the disease symptoms and attribute them to a pest or a microbe.
- Suggest the dose and rate of application of a pesticide/fungicide to control the diseases in horticulture plants.

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