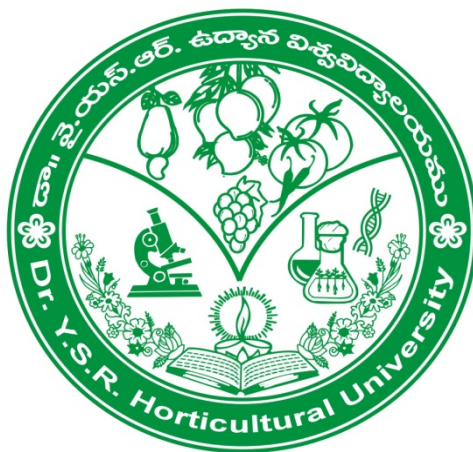


DIPLOMA COURSE CATALOGUE



Dr.Y.S.R. Horticultural University

**Venkataramannagudem,
West Godavari (Dist) – 534101**

Andhra Pradesh

Dr. YSR Horticultural University
Venkataramannagudem

Diploma Lecture Outlines

1st Semester

Course No.	Course Title	Credit score
DH-101	Fundamentals of Horticulture	3(2+1)
DH-102	Plant Propagation and Nursery Management	3(1+2)
DH103	Olericulture	3(2+1)
DH-121	Fundamentals of Soil Science	2(1+1)
DH-151	Farm power, Agricultural machinery and structures	2(1+1)
DH-161	English	2(1+1)
DH-171	Farm management, Agricultural Finance and Marketing	3(2+1)
	TOTAL	18(10+8)

2nd Semester

Course No.	Course Title	Credit score
DH-104	Tropical Fruit culture	3(2+1)
DH-105	Spices and Plantation Crops	3(2+1)
DH106	Commercial Floriculture	3(2+1)
DH-111	Principles of Breeding of Horticultural Crops	2(1+1)
DH-122	Manures and Fertilizers	2(1+1)
DH-141	Diseases of Horticultural Crops and their Management	3(2+1)
	TOTAL	16(10+6)

3rd Semester

Course No.	Course Title	Credit score
DH-201	Sub Tropical and Arid fruit culture	2(1+1)
DH-202	Medicinal and Aromatic crops cultivation	2(1+1)
DH-221	Organic and Inorganic chemistry	2(1+1)
DH-231	Pest Management of Horticultural Crops and Apiculture	3(2+1)
DH-232	Insecticides, Fungicides, Weedicides, bio-control agents and growth regulators (1+1)	2(1+1)
PHMP-101	Kitchen gardening	1(0-1)
PHMP-102	Commercial Nursery	1(0-1)
PHMP-103	Production Technology of Field Crops	1(0-1)
PHMP-104	Lawn and Landscaping	1(0-1)
PHMP-105	Organic Farming	1(0-1)
	TOTAL	16(6+10)

4th Semester

Course No.	Course Title	Credit score
DH-203	Protected cultivation of vegetables and flowers	2(1+1)
DH-204	Post Harvest Management of Horticultural crops and value added products	2(1+1)
DH-211	Seed production, certification and varietal testing	3(1+2)
DH-222	Dryland Horticulture and Watershed Management	3(2+1)
DH-261	Computer Science	2(0+2)
DH-271	Horticultural Extension, Teaching Methods and Communication Skills	2(1+1)
PHMP-106	Vermicomposting	1(0-1)
PHMP-107	Bonsai and Dry flower preparation	1(0-1)
PHMP-108	Cultivation of pulses and oil seeds	1(0-1)
PHMP-109	Value added products of fruits and vegetables	1(0-1)
PHMP-110	Bio-fertilizers	1(0-1)
	TOTAL	19(6+13)

Theory:

Definition of Horticulture – Importance of Horticulture. Area and production of Horticultural crops in A.P and India - Scope of Horticulture in India. Divisions of Horticulture with suitable examples and their importance. Nutritive value of various Horticultural crops. Horticultural zones in India and A.P.

Effect of temperature, light humidity and rain fall on growth and development of Horticultural crops; Effect of unfavourable atmospheric conditions on Horticultural crops; Measures to overcome unfavourable atmospheric conditions.

Orchard establishment – Points to be consider while selecting the soil for the establishment of orchard, Soil preparation, fence, wind breaks for orchard. Different steps followed in planning and layout of orchards. Different systems of planting orchards; Calculation of planting densities in different systems of planting.

Importance of irrigation; Irrigation methods and methods of fertilizers and manures applications followed in Horticultural crops; Training and pruning; Different types of training and pruning methods in Horticultural crops; Flower and fruit drop in fruit crops; Phases of fruit drop; Factors influencing fruit drop and control measures to stop fruit drop; Thinning of fruits- advantages and disadvantages; Definition of fruitfulness and unfruitfulness - Factors influencing unfruitfulness; Control measures to overcome unfruitfulness; climacteric and non climacteric fruits with examples.

Definition of weed- Effect of weeds on growth and yield of main crop; Integrated weed management (IWM) – Physical, mechanical, chemical and biological methods.

Plant growth regulators (PGR s)- Definition, Classification – Growth promoters, growth inhibitors and growth retardants; Application of Plant growth regulators in Horticultural crops.

Practicals:

1. Study of tools and implements in Horticulture.
2. Horticultural zones- Identification in India and A.P. map.
3. Study of different types of pots/containers-containers for seed sowing and plant growth.
4. Preparation of soil mixture for pots/containers.
5. Filling of pots, planting. Preparation of nursery beds for vegetable crops.
6. Study of different systems of planting methods.
7. Using plant board, Digging of pits for planting.
8. Planting of seedlings, after care.
9. Study of different irrigation methods followed in Horticultural crops.
10. Methods of application of manures and fertilizers in horticultural crops
11. Study of different methods of Training.
12. Study of different methods of Pruning.
13. Identification of weeds and herbicides/weedicides- weedicides used in main crop, application time, dosage, common name, trade name. Application of growth regulators in Horticultural crops.
14. Study of different types of mulches in Horticultural crops.
15. Visit to nearby commercial orchards (fruits, vegetables, flowers).
16. Visit to nearby Horticultural Research Stations.

Theory:

Propagation-Definition- Need for propagation-Potentialities for plant multiplication- Methods of Propagation of Horticultural crops; Propagation structures, glasshouses; Media for propagation;

Sexual method of propagation; Seed germination; Seed dormancy; Asexual method of propagation; Asexual/Vegetative propagation; Propagation by cuttings; Budding and Grafting methods and tissue culture / micro propagation.

Selection and maintenance of mother trees; pre curing of scion; collection of scion wood sticks; Stock and scion relationship- their influences; Characteristics of a good root stock- Important Rootstocks for Tropical, Subtropical and Temperate Fruit crops; Formation of graft union- factors affecting the healing of graft union; Graft incompatibility (Localised and translocated); means for graft success.

Commercial Nursery – importance, types of nursery, establishment of nursery, nursery management and quality characters of nursery grown plants.

Practicals:

1. Study of conditions suitable to improve seed germination.
- 2-3 Study seed vigour and viability tests.
- 4-6 Study of different tools, pots and media used in raising horticultural crops.
- 7-8 Practice of propagation by different methods of cuttings.
- 9-11 Practice of propagation by different methods of layering.
- 12-15 Practice of propagation by different methods of grafting and budding.
- 16-17 Propagation of important fruits, flower crops.
- 18-19 Study of application of growth regulators in fruit and flower crop propagation.
- 20 Preparation of Commercial Nursery models.
- 21-22 Visit to nearby commercial nurseries.
- 23 Study of packing of nursery grafted plants.
- 24 Study of transportation of nursery plants.
- 25 Visit to nurseries in protected structures.
- 26 Visit to Biotechnology / Tissue culture laboratory .
- 27-29 Study of construction of poly house, green house and shadenet house.
- 30-31 Study of breaking of seed dormancy methods.
- 32 Study of regulation of environment for raising nursery plants.

Theory:

Olericulture–Definition; Role of vegetables on food security and Indian economy; nutritional importance of vegetables

Production Technology of vegetable crops : Introduction, Origin, Area and Production, Composition and use, Description of Cultivars (Indian/Exotic); Soil and Climate; Seed Rate; seed treatment; Nursery techniques - Method of raising the Nursery; Main field preparation; Basal Application of Nutrients; Transplanting, Spacing; Irrigation; Nutrition – Fertilizers Schedule; Inter cultivation – Weed Control Mulching. Effect of Chemicals & Growth Substances on various growth and Yield Parameters; stages of maturity, Harvesting and Yield – Grading– Post Harvest Handling and Storage.

Physiological Disorders- and effect of growth substances in vegetables cultivation.

Production Technology

Solanaceous crops and others :	Tomato, Brinjal, Bhendi, Chilli
Cucurbits :	Botlegourd, Bittergourd, Ridgegourd, musk melon, water melon, cucumber, pumpkin
Beans & Peas :	Cluster bean, French bean, garden bean, cowpea, Pea
Cole crops :	Cabbage, Cauliflower
Root crops :	Radish, carrot, Beetroot, turnip
Tuber crops & bulb crops :	Potato, Sweet potato, Tapioca, Elephant foot yam, Colocasia, Onion, Garlic
Leafy vegetables :	Amaranthosis, Palak, Methi, Sorrel, Roselle
Perennial vegetables :	Parwal, drumstick, curryleaf, Coccinea

Practical:

1. Planning and layout of kitchen garden.
2. Nursery techniques for vegetable production.
3. Hardening techniques for vegetable production.
4. Methods of main field preparation.
5. Fertilizer application methods in vegetable cultivation.
6. Irrigation methods in vegetable cultivation.
7. Transplanting of nursery grown seedlings to main field.
8. Thinning of seedlings and gap filling.
9. Earthening up of plants.
- 10-11 Weed management and mulching.
12. New methods in vegetable cultivation.
13. Grading and storage of vegetables.
14. Methods of propagation of perennial vegetables.
15. Visit to nearby vegetable files.
16. Visit to vegetable research station.

Theory:

Soils – Introduction- Definition-surface and sub surface soil; Components of soil- Soil particles, soil water, soil air and microbes; Rocks and minerals –classification, formation of rocks; Withering and soil layer formation on earth; Soil structure, Study of soil profile. Physical properties of soil - soil texture, soil structure, bulk density, particle density, pore space, soil colour, soil temperature, soil water, importance and maintenance; Soil water – forms – hygroscopic, capillary and gravitational: soil moisture constants – hygroscopic coefficient, wilting point, field capacity, water holding capacity; Soil microorganisms – role of micro-organisms in mineralization, stabilization, nitrogen fixation, C: N ratio process. Soil colloids - organic colloids– humus conservation and management; Soil chemical properties - clay soil- nature and properties, cation and anion exchange-importance, pH, salinity, electrical conductivity (EC) - importance.

Soils of Andhra Pradesh – types -red soil, black soil, alluvial soil, rock soils, problematic soils, *etc.* and their management; physical and chemical properties; Essential elements/nutrients in plants-classification; Deficiency symptoms of nutrients in plants-management practices; Soil fertility – productivity – reasons to decline fertility; Balanced fertilization - Integrated Nutrient Management; Soils suitable for the fruit crops – Characteristics.

Practicals:

1. Study of Equipment used in soil science laboratory and preparation of standard solutions
2. Study of Tools used for collection of soil samples
3. Collection of soil samples from the horticultural fields and preparation of samples for evaluation
4. Soil texture analysis – Touch, hydrometer methods
5. Estimation of bulk density
6. Estimation of moisture content in the given soil sample – gravimetric and tensio meter method
7. Soil fertility test – Estimation of pH, EC
8. Soil testing – Estimation of organic carbon
- 9-11 Estimation of macro nutrients in soil
12. Soil and plant quick test – using soil testing kits
13. Estimation of amount of lime to reclamationize acidic soils
14. Estimation of amount of gypsum to reclamationize basic soils
15. Visit to soil testing laboratory
16. Visit to problematic soils

Theory:

Farm power; sources of different farm power - Human, Animal, Mechanical, Solar, Wind and Electrical powers; advantages and disadvantages; Internal combustion Engine – different components and their functions; Terminology related to engine power; Working principle of four stroke and two stroke cycle engine.

Tractors and power tillers – classification; types; parts; points to be considered in selection of tractors; Power transmission system of tractors – types of gears; working principle of power transmission system; maintenance and repairs of tractors.

Tillage – implements used for primary and secondary tillage – ploughs, harrows, cultivators; Mould Board (MB) plough – functions; constructional features; operational adjustments and maintenance; Disc plough – functions; constructional features; operational adjustments and maintenance; Secondary Tillers - Harrows – types; functions; operation of disc harrows; cultivators; Sowing equipment – seed cum fertilizer drills; types; functions.

Plant protection equipment – types of sprayers and dusters; constructional features, care and Maintenance of sprayers and dusters; Intercultural operation equipment - Tractor mounted equipment for land development and soil conservation; functions of guntakas, bund former, ridger, rotovators, hoes, weeders and leveling blade.

Harvesting equipment – equipment used in harvesting for horticultural crops – mango, sapota; Post-harvest equipment – blanchers; cleaners; graders; coloring sorter; packing equipment; equipment for storage – cooling systems; Greenhouses – structures; working mechanism; features; scope and importance in horticultural crops and their maintenance.

Practical

1. Study of power transmission systems and their working mechanism in tractors, start and stop of engine, connecting of other implements to the tractor.
2. Study of Operation and maintenance of tractor and cost calculation;
3. Compatibility of tractor in different horticultural works.
4. Study of working mechanism of power tiller - start and stop mechanism of engine; connecting of other implements to the power tiller.
5. Study of working mechanism and different parts in mould board plough and disc plough.
6. usage of harrow and cultivator in fields.
7. Study of different tools and implements in inter cultural operations (kurpi, spade, wheel harrow).
8. Study of harvesting equipment in mango and sapota.
9. Study of different post-harvest equipment used in blanching, washing, peeling, slicing, and cutting.
10. Study of Equipment used for juice making, filling, bottling and sealing.
11. Visit to cold storages
12. Visit to fruit processing unit.
13. Visit to vegetable processing unit.
- 14-15. study of modern horticultural implements and their maintenance.
16. Visit to farm machinery unit.

A. Parts of speech: Noun (types, kinds), pronoun (forms, a and kind of pronouns), Adjective-forms of adjective, types of verb and forms of verbs, concord, types of adverb, forms of adverb, preposition, types of preposition (rules in using preposition) conjunction (types of conjunction and rules, in using subordinate and coordinative conjunction and interjections).

B. Vocabulary: Synonyms, antonyms, homonyms, homophones, homograph.

C. Sentence - (i) Phrase, Clause (type of clauses), Sentence pattern: Subject and predicate, types of sentences: Simple, Compound and Complex, forms of sentences: Assertive, Imperative, Interrogative, Optative and Exclamatory.

(ii) Transform of sentences from active to passive and passive to active, from negative to positive, from superlative to comparative, from positive to comparative, from positive to superlative, remove too... to, use of unless, from assertive sentence to interrogative sentence, from exclamatory to assertive.

D. Correction of Errors: (articles, singular and plural noun, abstract, noun, words ending with -ior of adjective (senior, junior, prior, and ending without 'ior' but relates phonetical: prefer, younger, elder, and... between preposition, verb, degree of comparison)

E. Spellings rules reference with Wren and Martin Grammar book - ing, er, est, ing and others words ending with eve, sion, tion

F. Comprehension : Selected passages

- 1) G.B. Shaw's Pygmalion, Act I Scene II
- 2) Nissim Ezekiel's A very Indian Poem in Indian English
- 3) Forgetting by Robert Lynd
- 4) The Worship of Wealthy by G.K. Chesterton

G. Written skills: Mechanics of good letter: effective business correspondence, personal correspondence. Preparation of curriculum vitae and job applications. Precise writing and synopsis writing. Interview: types of interviews, poise. Speech, self esteem, self reliance, evaluation process. Review of Feedback, practical.

H. Listening comprehension: Listening to short talks lectures speeches (Scientific, commercial and general in nature) - listening to least two tape, recorded conversations aimed at testing the listening comprehension of students. Spoken English, oral communication importance of stress and intonation - spoken English practice by using audio-visual aids the essentials of good conversation, oral exercises in conversation practices.

I. Oral skills: How to present one's thoughts or expression, how to prepare for seminar, how to overcome stage fear.

Practicals:

- 1-8 Assignments on the subjects and presentation of Seminar topics
- 9-10 Letter Writing (Formal and Informal)
- 11-12 Essay Writing
- 13 Elocution
- 14-16 Debate and Group Discussion

Theory

Farm Management – Definition; scope; objectives; farm management decisions; Maintenance of Agricultural farm labour and farm machinery; Farm Records -Definition, Features, Advantages; types of Farm records; Maintenance of income and expenditure of farm record; Farm planning - Definition and Features; Crop rotation.

Loan – Definition; Classification of loans and procedure to apply loan; Procedural formalities of banks to sanction loans; Schemes for backward classes to repay the loans; Differential Interest Rate (DIR) – Eligibility criteria; Identification of eligible candidates for loan; Integrated Rural Development Programme (IRDP) - eligibility criteria; Identification of eligible candidates for Loans; Subsidy; Schemes; Reserve Bank of India (RBI) - Funds to the agriculture sector; Role in agriculture sector; NABARD – Aims and objectives; Role in agriculture sector; Nationalization of commercial banks; Lead Bank schemes –Definitions; Duties and Benefits; Crop loan method – Definition; Importance; Protocols; Crop insurance details - Advantages and limitations.

Market - Definition – Importance; Features; Classification of Markets – Based on location, area, time line, behaviour of the goods, number of commodities, competition (perfect competition and imperfect competition); Perfect competition market–Features and Examples; Price fixation; Imperfect competition market- Features and Examples; Market duties; constraints in marketing; Measures to overcome constraints; Market information – Criteria for good marketing; Market intelligence; Regulated market – Definition; History; Benefits; Duties; Co-operative Societies for farmers - Features and Laws; Co-operative marketing – Definition; Duties; Benefits; Role of NAFED in Co-operative marketing; Role of MARKFED in Co-operative marketing; Central ware housing corporation – Duties; State ware housing corporation – Duties; Food Corporation of India – Importance; Duties and Benefits; World Trade Organization (WTO) - Aims and objectives; General Agreement on Trade Tariff (GATT) - Duties and Importance; Patent Rights - History and Act.

Practical

- 1.Maintenance of farm records.
- 2-3. Estimation of cost of cultivation in major horticultural crops.
- 4-5. Study of preparation of farm planning to apply farm loans.
- 6-7. Computation of different methods for loan repayment.
- 8.Visit to different sources of loans - Commercial Bank -Regional Rural Banks (RRB) - National Bank for Agricultural & Rural Development (NABARD)
- 9-10. Visit to agricultural and horticultural processing units.
- 11.Visit to Progressive farmer field.
- 12.Visit to Rythu bazaar.
- 13-14. Visit to seed production units - National Seed Production Corporation (NSPC) and private seed production units.
15. Visit to APEDA.
16. Identification of markets for various horticultural products and computation of marketing costs, marketing margins and price spread.

Theory:

Mango, banana, citrus, pine apple, guava, papaya, jack fruit and sapota etc., area, production, role in economic development of India orchard cultivation-importance, nutritive value, origin & distribution, important species and varieties, root stocks, role of high density planting system, climate, soils, planting methods, training and pruning, fertilizers, irrigation, intercrops, intercultural operations, maturity indices, pre-harvest treatment/management, yield, grading, packing and storage of produce for the domestic and international market.

Practicals:

1. Division and identification of different varieties of Mango.
2. Identification of different species of Citrus.
3. Classification and Identification of varieties of Banana.
- 4-5. Description of commercial varieties in Mango.
- 6-7. Description of commercial varieties in Banana.
8. Visit to commercial orchards.
9. Identification of Papaya and Pineapple varieties.
10. Description of commercial varieties in Guava and Sapota.
11. Chemical/Latex extraction Papain from Papaya Fruits.
12. Estimating the Cost and Income/Revenue of Commercial Orchards.
13. Description of pineapple varieties and propagation.
14. Propagation of Mango, Banana and Citrus crops.
15. Propagation of Guava and Sapota.
16. Visit to Local Fruit Market and Fruit Research Station.

Theory:

Introduction, importance, classification of spice crops according to botany, species, varieties, propagation, planting, selection of rhizomes for planting, climate, soil, skills in planting, post-planting precautions, fertilizers, crop cultivation techniques, training and pruning, flowering process, fruit set, fruit development, maturity stage/ripening, harvesting, refining/processing techniques, marketing and preparation of value-added products.

Spices: Pepper, cardamom, turmeric, ginger, coriander and fenugreek.

Plantation crops: Coconut, cashew nut, oil palm, areca nut, betel vine, cocoa and coffee

Practicals:

1. Spices - Description and identification of different subspecies and varieties.
2. Propagation methods of important spices (Pepper and cardamom).
3. Turmeric and Ginger rhizomes Storage Methods.
- 4-5. Turmeric and Ginger Curing/Processing Procedure.
6. Visit to commercial spice gardens.
7. Description and identification of Coconut varieties.
8. Method of Selection of coconut seed nuts, Raising of nursery
9. Description and identification of Cashew nut varieties.
10. Oil palm propagation and Raising of nursery.
11. Description and propagation of Areca nut varieties.
12. Description, propagation and training of Betel vine varieties.
13. Propagation method of Cashew nut.
14. Processing of Oil palm.
15. Processing of Cocoa
16. Processing of Coffee.

Theory:

Important commercial flower crops/plants - rose, cultivation methods of rose crossandra, jasmine, chrysanthemum, gladiolus, tube rose, china aster, marigold, anthurium, carnation, gerbera, dahlia and orchids - importance, origin, taxonomy, subspecies, varieties, soils, climate, propagation, plant spacing, irrigation, fertilizers, intercropping, training and pruning, special/important horticultural practices/techniques, use of growth regulators, harvest indices, harvesting, yield, post- harvest methods and method of preparation of dry flowers.

Practicals:

- 1-6. Identification and description of different cut flowers- Rose, Jasmine, Marigold, Gladiolus and Orchid
- 7-8. Identification of Root stocks and Budding method in Rose.
9. Study of Training and pruning in rose
10. Study of Training and pruning in jasmine.
11. Visit to flower market.
12. Preparation of Greeting Cards and Bouquet.
13. Visit to the flower crops of the farmers.
14. Increasing the Storage Capacity/Shelf life of flowers and Flower Vase Decoration
15. Learning of Method of preparation of Bouquet and Garlands/wreaths.
16. Study of Method of preparation of dry flowers.

Theory:

Cell structure, chromosomes, cell division, mitosis meiosis, mendel laws, genetic dominance theory, mono hybrid, di/double hybrid ratios.

Definitions of genetics, gene, allele, genotype, phenotype, homozygosity, heterozygosity, homogeneity, heterogeneity, pureline, inbred, hybrid, synthetics and composites, self incompatibility, male sterility, heterosis /hybrid vigour etc., hybrid vitality, etc.

Modes of reproduction - sexual and asexual reproduction - examples - pollination – types of pollination - self-pollinated and cross pollinated crops. The relationship between pollination type and genetic structure and their importance in plant genetic breeding.

Objectives of plant reproduction. Types of plant breeding, introduction, selection hybridization-successes - breeding methods in vegetatively propagated plants, clonal selection successes.

Scope and importance of polyploidy breeding and mutant breeding in horticultural crops.

Practicals:

Understand the Botanical Description/names, family, floral parts, its components, Selfing, Emasculation and hybridization methods and useful plant parts of the following Horticultural crops.

1. Tomato (Solanaceae)
2. Brinjal (Solanaceae)
3. Bhendi/Okra (Malvaceae)
4. Onion (Liliaceae)
- 5-7 Gourds and Melons (Cucurbitaceae)
8. Mango (Anacardiaceae)
9. Citrus (Rutaceae)
10. Sapota (Sapotaceae)
11. Papaya (Caricaceae)
12. Rose (Rosaceae)
13. Chrysanthemum (Asteraceae)
14. Coconut (Arecaceae/Palmae)
15. Beans (Fabaceae)
16. Coriander (Apiaceae)

Theory:

Organic manures-definition, properties, classification. Bulky organic fertilizers – farm yard manure (FYM), compost, vermicompost - preparation, nature, useful nutrients. Concentrated organic manure - oil cake (flour), bone meal. Green manure crops - suitable green manure crops for different soils - characteristics, decomposition nature. C: n ratio, nutrients availability - benefits and problems. Biogas plant- use of biogas effluents. Chemical fertilizers - definition, properties, classification - macro nutrients requirement Nitrogen (N), Phosphorus (P), Potassium (K), Calcium (Ca), Magnesium (Mg) and sulfur fertilizers - properties, suitable fertilizers for different soils and for crops. differences between organic and in-organic fertilizers, essentiality of micronutrients in plants. Bio-fertilizers - definition, properties, classification. azolla, blue green algae, rhizobium, azatobacter, phosphobacteria fertilizers - methods of usage. symptoms of nutrient deficiencies in horticultural crops and their corrective measures. factors affecting the effective utilization of fertilizer/fertilizers use efficiency (FUE). integrated nutrient management in important horticultural crops.

Practicals:

1. Study of different types of organic and chemical fertilizer samples.
2. Methods of collecting samples of organic and chemical fertilizers and preparing samples for analysis.
- 3-4. Study of Green Manure crops - Raising Green Manure crops in the field.
5. Preparation of Farm Yard Manure.
6. Preparation of Compost with Agricultural waste.
7. Visit to Municipal Compost Yard.
8. Preparation of Vermi Compost.
9. Visit to Vermi Compost Unit.
10. Calculating the dose of Nitrogen, Phosphorus and Potassium chemical fertilizers.
11. Calculating the dose of Complex Fertilizers.
12. Precautions to be taken while using and storing chemical fertilizers.
13. Visit to Fertilizer Testing Center/Laboratory.
- 14-16. Visit to Farmer Field – Identification of Nutritional Deficiencies in various Horticultural Crops and their corrective measures.

Theory:

Important diseases affect the following crops - pathogens, classification/taxonomy disease symptoms and spread. Citrus, mango, guava, sapota, papaya, banana, grapes, pomegranate, ber, chilli, brinjal, bhendi, tuber crops, tomato, onion, coriander, cruciferous crops, cucurbits, beans, peas, betel vine, pepper, ginger, turmeric, coffee, coconut, oil palm, rose, chrysanthemum, jasmine, marigold, tube rose, crossandra, china aster, gladiolus.

Fungicides - classification, mode of action, usage, dosage, toxic effect on plants, diseases controlled by important fungicides.

Practicals:

1. Method of Microscope Usage.
2. Citrus Diseases, Symptoms, Causes and Management/Control/preventive measures.
3. Mango Diseases, Symptoms, Causes and Management/Control/preventive measures
4. Guava, Sapota and Grapes Diseases, Symptoms, Causes and Management/ preventive measures.
5. Banana, Papaya Diseases, Symptoms, Causes and preventive measures.
6. Ber, Phalsa and Pomegranate Diseases, Symptoms, Causes and Management/Control/preventive measures
7. Chilli, Brinjal and Coriander Diseases, Symptoms, Causes and Management/Control/preventive measures.
8. Potato, Tomato, Bhendi, Onion Diseases, Symptoms, Causes and Management /Control/preventive measures.
9. Diseases, Symptoms, Causes and control measures of Cruciferous Crops.
10. Diseases, Symptoms, Causes and control measures of Cucurbits
11. Diseases, Symptoms, Causes and control measures of Elephant foot yam, Colocasia, Ginger, Turmeric and Betel vine diseases, symptoms, causes and preventive measures.
12. Coconut, Coffee and Oil palm diseases, symptoms, causes and preventative/control measures.
13. Rose, Chrysanthemum, Jasmine, Marigold diseases, symptoms, causes and preventive/control measures.
14. Diseases, Symptoms, Causes and prevention/control measures of Crossandra, China Aster, Gladiolus, Gerbera and Carnation.
15. Observation of fungicide technology and trade names commonly used in horticultural crops.
16. Calculating the dosage of various fungicides solutions.

Composition and uses, origin and distribution, species and varieties, rootstocks, climate and soil requirements, spacing and planting methods, propagation (grafting and budding techniques), nutrient management, water management, weeds management, training and pruning methods, regulation of cropping, use of plant growth regulators, post harvest handling (grading, packing, transportation and storage) in grape, annona, ber, jamun, bael, aonla, pomegranate, fig, phalsa, litchi, custard apple, passion fruit, karonda and tamarind.

Practicals:

1. Description of varieties of Grape
2. Description of varieties of Ber
3. Description and identification of different types of Custard apple species.
4. Description and identification of varieties of Pomegranate
5. Description of varieties of Aonla and Tamarind
6. Training and Pruning of Grape
7. Training and Pruning of Ber
8. Training and Pruning of Pomegranate
9. Pruning of Phalsa
10. Flowering & fruit set, Fruit drop and its control in Ber
11. Propagation methods of Jamun
12. Propagation methods of Aonla
13. Propagation methods of Fig
14. Description of varieties of Fig
15. Description and identification of varieties of Litchi, Passion fruit and Karonda
16. Visit to local commercial fruit orchards.

DH - 202 MEDICINAL AND AROMATIC CROPS CULTIVATION 2(1+1)

Origin and history, area and production, importance, uses, varieties, soil and climate, propagation, planting and after care, management of irrigation, nutrition, cultural operations, training and pruning, harvesting, yield, processing and grading of aloe, dioscorea, ashwagandha (indian ginseng), isabgol, indian gooseberry, kalmegh, guggal, opium poppy, ocimum (holy basil), periwinkle, rauvolfia, senna, pyrethrum, citronella, West Indian lemon grass, lemon grass, sweet sage wort, geranium, khus grass, palma rosa, mint, eucalyptus, vanilla, rose and jasmine.

Practicals:

1-6 Description of medicinal and aromatic crops

7-8 Identification of different varieties of medicinal and aromatic crops

9-10 Collection of locally available medicinal and aromatic plants and preparation of herbarium

11-12 Extraction of essential oil from aromatic plants

13-16 Visit to research stations/institute conducting research on medicinal and aromatic crops.

Atomic structure, sub-atomic particles, atomic models; classification of elements, periodicity in properties, electronic configuration and types of elements s,p,d and f blocks; chemical bonding and molecular structure, different types of bonds and bond parameters; s-block elements: - biological importance of sodium and potassium; alkaline earth metals – biological importance of calcium and magnesium; p-block elements – uses of boron, aluminium and their compounds; p-block elements – some important compounds of carbon and silicon; organic chemistry – some basic principles and methods of purification of organic compounds, polymers – bio-degradable polymers; qualitative and quantitative elemental analysis of organic compounds; hydro carbons – classification of hydrocarbons; biomolecules - carbohydrates, proteins, enzymes, nucleic acids.

Practicals:

1. Usage of Glassware, chemicals and equipments in the laboratories.
2. The analysis of simple formula and their methods.
3. Salt analysis- Different types of Acids and Bases.
4. Analysis of pH indicator, pH scale, different types of acids and bases.
5. Confirmative test for concentrations of different acids.
6. Analysis and confirmation of pH in different fruit juices.
7. Qualitative tests for carbohydrates (Glucose and Fructose).
8. Qualitative tests for Proteins (Eggs, Milk and Pulses).
9. Methods for preparation of colloids.
10. Estimating the weight of Ferrous Ammonium Sulphate.
11. Estimating the weight of Potassium Permanganate.
12. Determination of Soil Organic Carbon.
13. Determination of Soil available Nitrogen.
14. Study of using Potassium Bisulphite as food preservative in different types of foods.
15. Study of Enzymatic activity.
16. Separation of Pigments present in the leaves and flowers by using Paper Chromatography method.

**DH-231 PEST MANAGEMENT OF HORTICULTURAL CROPS AND
APICULTURE 3(2+1)**

Theory:

Classification and Identification of horticulturally important insect pests upto orders; IPM – introduction - importance – evolution of IPM– concepts and principles of IPM – Economic Threshold Level (ETL) – Economic Injury Level (EIL) and General Equilibrium Position (GEP) – tools or components of IPM – practices, scope and limitations of IPM; Study of insect pests of Mango, citrus, cashewnut Grape, Pomegranate, Coconut, Cocoa, Ber, Fig, Guava, Sapota, Banana, Papaya, Ginger, Turmeric, Tomato, Chilli, Bhendi, Brinjal, Beans, Rose, Chrysanthemum, Jasmine, Tuberose etc.

Study Non-insect pests - Mites, Nematodes, Rodents, Bats, Monkeys, Birds, Crabs and Snails damage to Horticultural crops- Management strategies; Study of Acaricides, Rodenticides, Molluscicides, Nematicides etc; Insecticides- Definition, Classification of insecticides based on origin, mode of entry, mode of action and mode of toxicity - toxicity of insecticides; Insecticide residues-phytotoxic effects of insecticides - advantages and limitations of chemical control – Application techniques and safe use of insecticides.

Importance and history of bee keeping, apiculture and apiary, different species of honey bees in India; Different castes of honey bees, biology, their duties, morphological differences, caste determination, communication in bees; Bee colony maintenance - Swarming, swarm prevention, colony management in different seasons, bee pasturage; Types of bee hives, their description; Equipment and accessories for apiary; Natural enemies and diseases of bees- Their prevention and control; Artificial ripening of honey and honey extraction.

Practical's:

1. Methods of collection and preservation of insects.
2. Identification of horticulturally important insect pests of different orders.
3. Study of symptoms of damage of different insects to plant parts.
4. Identification of insects and symptoms of damage of Mango, Citrus, Cashewnut, pests.
5. Identification of insects and symptoms of damage of Grape, Pomegranate, Ber, Guava, Sapota, Banana, Papaya, pests.
6. Identification of insects and symptoms of damage of pests of Coconut, Cocoa.
7. Identification of insects and symptoms of damage pests of Chillies, Bhendi, Brinjal and Tomato.
8. Identification of insects and symptoms of damage pests of Cucurbits and Cruciferous crops.
9. Identification of insects and symptoms of damage pests of Beans, Potato and Leafy vegetables.
10. Identification of insects and symptoms of damage pests of Rose, Chrysanthemum, Marigold, Jasmine.
11. Calculations of insecticide doses/concentrations of different formulations.
12. Study of various plant protection appliances.
13. Study of chemical and trade name of different insecticides.
14. Study of different bee hives and apiculture equipments.
15. Rearing and Handling methods of European bee/Little bee, *Apis mellifera*
16. Methods of honey extraction.

Insecticides and Fungicides – Definition – Uses and side effects – Classification – Nature – Degradation – Continuity of application – Application time – Classification of Insecticides and Fungicides based on certification and non-certification.

Definition and study of Bio control agents and Fungicides, precautions to be followed during application.

Weedicides

Weeds – Definition – Classification of weeds based on life cycle and cotyledon number, critical period of crop – weed competition Chemical Weedicides – Definition, uses and harmful effects (disadvantages).

Classification of chemical weedicides – Mode of action, time of application, classification of weedicides based on selectivity and translocation.

Biological weed control – definition and study of different biological agents – Precautions followed during application.

1. Biological agents – Definition, Growth regulators – Definition and classification.
2. Formative actions of Auxins, Gibberellins and Cytokinins.
3. Formative actions of abscissic acid, Ethylene and other growth regulators (Maleic Hydrazide, Paclobutrazole, Salicylic acid and Polyamines).
4. Role of growth regulators in improving the yields of Horticultural crops.

Practicals:

- 1-2 Study of insecticides and fungicides used in horticultural crops, study of technical and trade names of insecticides and fungicides.
- 3-4 Insecticides and fungicides – Calculation of dosage.
- 5-6 Study of application methods of Insecticides and Fungicides
- 7 Formulations of Insecticides and Fungicides
- 8 Study of application equipments of Insecticides and Fungicides
- 9 Study of Weedicides used in horticultural crops – Study of Technical and trade names
- 10 Calculation of dosage of chemical weedicides
- 11 Study of application methods of weedicides
- 12 Study of equipments used in application of different weedicides
- 13 Study observation of usage of Auxins in rooting of cuttings
- 14 Usage of Gibberellins to overcome dormancy and facilitate germination
- 15 Usage of Ethylene in fruit ripening
- 16 Observation on the role of Abscissic acid on closing of stomata.

DH-203 PROTECTED CULTIVATION OF VEGETABLES AND FLOWERS 2 (1+1)

Protected cultivation – introduction, importance and scope. Green house/ poly house- definition- factors to consider before construction of green house- Advantages of cultivation of horticultural crops in greenhouses over traditional method of cultivation, problems/ constraints of greenhouse cultivation and future strategies; construction of greenhouse, place, types and different sizes of green houses. Planning and designing of greenhouse construction.

Soil and soil less growing media and its sterilization. Ventilation in greenhouses. Fertilizer management through fertigation at different stages of crops. Water soluble fertilizers and straight micronutrients usage in green houses.

Cultivation of Rose, Gerbera, Tomato and Capsicum in green houses- suitable varieties, physiological disorders and their remedies, protection measures, post harvest technologies, practices and precautions to be taken during pre and post harvesting of produce for the export- Instructions for export of produce.

Practicals:

1. Study of different parts of green houses (types based on shape, construction and cladding materials)
2. Preparation of growing media and its sterilization
3. Identification of different types of soil less growing media
4. Preparation of beds for different crops in greenhouses
5. Irrigation scheduling for raising horticultural crops in greenhouses
6. Study of fertigation requirements for greenhouse crops
7. Training and pruning methods in greenhouse grown crops like rose, gerbera, tomato and capsicum
8. Study of pollen studies in greenhouse grown Tomato
9. Identification of nutrient deficiencies and its remedies in greenhouse grown crops
10. Identification of physiological disorders and its remedial measures in greenhouse grown crops
11. Identification of pests and diseases and its management in greenhouse grown crops
12. Production and post harvest measures (harvesting stages, grading etc) in greenhouse cultivation
13. Post harvest packing methods for exporting the produce
14. Visit to study different types of greenhouses
15. Visit to study vegetable production in a commercial greenhouse
16. Visit to study flower production in a commercial greenhouse.

Importance of post harvest technology of Horticultural crops (Fruits, Vegetables and flowers)- ripening stages, Harvesting, Handling and Grading. Pre-harvest factors and post harvest factors responsible for quality of produce (factors affecting for post harvest losses). Fruit ripening: Physiological and Biochemical changes; Ripening regulation methods (Hastening and Delaying). Post-harvesting treatments, quality parameters and grade specifications of horticultural produce. Transportation of produce to local markets and long distance markets. Methods of storage for local market and export. Type of packaging and Refrigerated storage (cold storage).

Study of value added products of fruits and vegetables, Reasons for underdevelopment of value added product industries in India.

Preparation of jam, jelly, and marmalade preserves, candy, crystallized and glazed fruit, chutneys, pickles, ketchup, sauce, tutti frutti, sugar syrup, fresh fruit juices, squash and cordials, fermented beverages.

Practicals:

- 1-3. Determination of maturity indices of horticultural crops (Fruits, Vegetables and flowers)
- 4-6. Determination of physiological loss in weight and quality
- 7-8. Grading of horticultural produce (Fruits, Vegetables and flowers)
- 9-10. Methods of post harvest management (Post harvest treatment of horticultural crops, physical & chemical methods)
11. Study of different packing methods: Packaging studies in Fruits, Vegetables and flowers by using different packing material
12. Study of methods of storage
- 13-14. Post harvest disorders in horticultural crops
- 15-16. Visit to cold storage and packing houses.

DH-211 SEED PRODUCTION, CERTIFICATION AND VARIETAL TESTING 3(1+2)

Introduction to seed production, definition and concept. Variety-definition, Varietal Maintenance. Methods/ process of Nucleus and Breeder seed production in self pollinated, cross pollinated and vegetatively propagated crops. Process/ method of vegetable seed production. Testing of genetic purity of seeds. Principles of seed production, different types of seed production, soil requirements, Isolation distances, planting ratio, roughing, harvesting time and post harvest management, packing and storage methods for some important vegetable crops.

Seed purity certification-scope, standards of seed certification, determination of seed purity. Factors/ Characters to be taken into consideration for seed purity determination.

Different methods to find seed germination percentage, Grow-out test, seed vigor, seed viability- seed health, results of seed testing, seed purity analysis methods in different horticultural crops, different types of seed production methods, Breeder seed production, foundation seed production and certified seed production/ purity seed production. New seed policy, suitable locations for vegetable seed production.

Practicals:

1. Seed sample- instruments, seed treatment methods in different crops
2. Testing of moisture percentage in different seeds
3. Germination Analysis (Testing of germination percentage)
4. Identification of Normal and Abnormal seeds
5. Identification of healthy and unhealthy seeds in different crops.
6. Seed testing, germination tests, purity tests
7. Tetrazolium test.
8. Maintenance of seed godowns
9. Field visit to seed processing unit
10. Roughing of off types in different crops
11. Maintenance of records and analysis of results in seed testing Laboratories.
12. Procedure for seed production in horticultural crops- soil and Isolation distances, collection of pollen, artificial cross pollination
13. Maintenance of Flower and Vegetable nurseries.
- 14-17 Seed production in Tomato, Brinjal, Bhendi and Chilli crops
18. Seed production in Bulb crops (Onion, garlic)
19. Seed production in root vegetable crops
20. Seed production in leafy vegetables
21. Seed production in cole crops (Cabbage and Cauliflower)
22. Varietal identification through Grow Out Test (GOT)
- 23.-25 Seed production in Crossandra, Marigold and china aster crops
- 26-27 Visit to seed production Units
- 28-29 Seed production in cucurbitaceous crops
- 30-31. Seed production in perennial vegetables (Coccinia and Drumstick)
32. Visit to seed treatment unit

DH-222 DRYLAND HORTICULTURE AND WATERSHED MANAGEMENT 3(2+1)

Dryland horticulture-definition, principle resources- Soil, Water Management, Arid climate Regions-classification, Dryland horticulture Research stations and their achievements. Problems faced in Dryland horticulture. Land use systems in Low rainfall areas; Rainfall pattern and distribution of rain in Dryland areas- drought- types- factors responsible for drought, measures to mitigate and management of drought. Soil Erosion-types, factors responsible for erosion-cultural methods, Mechanical methods and soil conservation through forestry methods to prevent / reduce erosion.

Fertilizer management in Dryland horticulture, chemical, organic and bio fertilizers; Cropping systems and patterns for severe drought conditions and its management. Transpiration-Evapo-transpiration-definition, procedures to avoid evapo-transpiration / transpiration.

Watershed-definition, aim and Management. Alternate land use systems, Alley cropping, Agri-silviculture, Agri-Horticulture, Hori-Pasteural, Silvi-Pasteural, Lay farming and Tree farming

Practicals:

1. Allotment of plots to students, seed bed preparation
2. Tillage methods for Dryland horticulture, deep ploughing, minimum tillage.
3. Fertilizer application methods and seed sowing methods in horticultural crops
4. Study of Dryland horticulture implements
5. Study of soil moisture conservation methods
6. Testing of Soil treatments for moisture conservation
7. Cultural Methods to conserve soil moisture
8. Study of mulching
9. Study of Anti-transpirants
10. Visit to watershed Areas
11. Collection of growth parameters data of Dryland horticultural crops.
12. Study of effect of drought on crops
13. Study of soil erosion at field level
14. Collection of data regarding temperatures and transpiration
- 15-16. Collection of data regarding harvesting, post harvesting works, yield of Dryland horticultural crops

PRACTICALS:

Practice of DOS Command:

- 1) Practice of DOS commands – TIME, DATE, DIR, MD, CD, RD, DEL, TREE, COPY, VOL and LABEL
WINDOWS
- 2) Study of Computer Components – Booting of Computer and its Shut Down
- 3) Create a new folder and do the following:
 - i) Make a word document in it.
 - ii) Make a new folder in it
 - iii) Rename the initial folder
 - iv) Move the initial folder
 - v) Copy the initial folder.
 - vi) Delete the initial folder
- 4)
 - i) Explore the taskbar of Windows.
 - ii) Set the wall paper and screen saver.
 - iii) Set the date/time.
 - iv) Implement various display properties by right clicking on the Windows Desktop.
- 5) Implement the various well known features of Windows operating system such as Notepad, WordPad, Paint, System tools, Entertainment etc. enclosed in Start → Programs → Accessories.

MS-Word

- 6) Create a document and
 - i) Put Bullets and Numbers
 - ii) Apply various Font parameters.
 - iii) Apply Left, Right, and Centre alignments
 - iv) Apply hyperlinks
 - v) Insert pictures
 - vi) Insert ClipArt
 - vii) Show the use of WordArt
 - viii) Add Borders and Shading
 - ix) Show the use of Find and Replace.
 - x) Apply header/footers

- 7)
 - i) Create a document to show the use of Washout/Watermark.
 - ii) Implement the concept of mail merge.
- 8)
 - i) Design E-book cover pages / Magazine front/ books front/back page using cover page option in Insert Menu.
 - b) Use smart art and create organization charts
- 9)
 - i) Implement the concept of importing a file/document.
 - ii) Implement the concept of merging the documents.
- 10) Get the newspaper and see the text-based advertisement and Design that advertisement
- 11) Create a letterhead, Identity card of any company or institution
- 12) Create a student table and do the following:
 - i) Insert new row and fill data
 - ii) Delete any existing row
 - iii) Resize rows and columns
 - iv) Apply border and shading
 - v) Apply merging/splitting of cells
 - vi) Apply sort
 - vii) Apply various arithmetic and logical formulas.
- 13) Create your resume using General Templates.

MS-Excel

- 14) Create Salary statement of an employee
- 15) Create performance register of a student.
- 16) To compute mean/median/mode.
- 17)
 - i) Generate graph to show the production of goods in a company during the last five years.
 - ii) Compare the cost, overheads and sales figures of a company for last three years through appropriate chart.
- 18) Create any worksheet and apply various mathematical, statistical and financial functions.
- 19) Create worksheet and enter marks data and do the following
 - i) Create chart of the marks.
 - ii) Compute sum of marks using auto sum, auto calculate and sum function
 - iii) Compute average of marks
 - iv) Show pass or fail if marks are above 50 or less than 50e.
 - v) Put header and footer in the spread sheet.

MS-PowerPoint

20) Make a presentation of College Education System using

- i) Blank Presentation
- ii) From Design Template
- iii) From Auto Content Wizard

21) Make a presentation on “Wild Life” and apply the following:

- i) Add audio and video effects
- ii) Apply various Color Schemes
- iii) Apply various animation schemes.
- iv) Apply Slide Show

MS-Access

22. i) Create a Student database in Design View, by using Wizard, and by entering data

ii) Create a query on Student database in design view and by using wizard.

23) i) Create forms of Student database in design view and by using wizard.

ii) Create reports of student database in design view and by using wizard.

24) i) Create data access pages of student database in design view and by using wizard.

ii) Implement the concept of Macros in MS-Access.

Internet

25) Connect the Internet; open any website of your choice and save the WebPages.

26) Search any topic related to your syllabi using any search engine and download the relevant material.

27) Create your E-Mail ID on any free E-Mail Server.

28) Login through your E-Mail ID and do the following:

- i) Read your mail
- ii) Compose a new Mail
- iii) Send the Mail to one person
- iv) Send the same Mail to various persons
- v) Forward the Mail
- vi) Delete the Mail
- viii) Send file as attachment

29) Surf Internet using Google to find information about your state

30) Surf Internet using Google to find Tourism information about your state

31) Surf Internet using Yahoo to find Horticultural research stations around your country

32) Surf Internet using Google to find information about educational institutes for teaching

B.Sc. in Horticulture in India

**DH-271 HORTICULTURAL EXTENSION TEACHING METHODS AND
COMMUNICATION SKILLS 2(1+1)**

Horticulture Extension- meaning-objective-scope. Principles of horticultural Extension. Extension Teaching methods-meaning and classification

Individual contact-group contact-mass contact methods- meaning- method- advantages and limitations. Audio-visual aids, meaning, classification and their importance in horticultural extension programs.

Visual aids (Poster, charts, panel graphs, flash cards), horticultural information aids (pamphlets, folders, circular letter, information letter and bulletins)- meaning-procedure for preparation. Audio aids meaning, Radio and Tape records and their usage in horticulture extension programmes.

Communication skills, English grammar, Active voice and passive voice, direct and indirect speech, articles (A, An, The)-Usage, synonyms, antonyms, letter writing, usage of dictionary, preparation of bio-data, report writing.

Practicals:

- 1-4. Preparation of Poster, Charts, Flash cards and fennel graphs
- 5-8. Preparation of folder, pamphlet, circular letter, information letter and bulletin
- 9-10. Organization of group meeting and group discussions
- 11-12. Organization of Method demonstration and result demonstration
13. Study of letter writing to different heads of institutes.
14. Study of preparations of bio-data.
15. Study of report writing to different programs
16. visit to Farmer's Meeting.