LECTURE OUTLINES

DIPLOMA IN HORTICULTURE

SRI KONDA LAXMAN
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SEMESTER WISE COURSES

First Semester		Credits
DH-101	FUNDAMENTALS OF HORTICULTURE	2+1
DH-102	PLANT PROPAGATION AND NURSERY MANAGEMENT	1+2
DH-103	OLERICULTURE	2+1
DH-121	FUNDAMENTALS OF SOIL SCIENCE	1+1
DH-151	FARM POWER, AGRICULTURAL MACHINERY & STRUCTURES	1+1
DH-171	FARM MANAGEMENT, AGRICULTURAL FINANCE AND MARKETING	2+1
	TOTAL	9+7
Second Semester		Credits
DH-104	TROPICAL FRUIT CULTURE	2+1
DH-105	SPICES AND PLANTATION CROPS	2+1
DH-106	VALUE ADDED PRODUCTS OF FRUITS AND VEGETABLES	1+1
DH-122	MANURES AND FERTILIZERS	1+1
DH-141	DISEASES OF HORTICULTURAL CROPS AND THEIR MANAGEMENT	2+1
DH-152	SOIL AND WATER ENGINEERING	1+1
	TOTAL	9+6
Third Semester		Credits
DH-201	SUB-TROPICAL AND ARID FRUIT CULTURE	2+1
DH-202	COMMERCIAL FLORICULTURE	2+1
DH-211	SEED PRODUCTION, CERTIFICATION AND VARIETAL TESTING	1+2
DH-231	PEST MANAGEMENT OF HORTICULTURAL CROPS AND APICULTURE	2+1
DH-232	FIELD DIAGNOSIS OF HORTICULTURAL CROPS	0+2
	TOTAL	7+7
Fourth Semester		Credits
DH-204	POST HARVEST MANAGEMENT OF HORTICULTURAL CROPS	1+1
DH-205	ORNAMENTAL GARDENING AND LANDSCAPE ARCHITECTURE	2+1
DH-206	MEDICINAL AND AROMATIC CROPS CULTIVATION	2+1
DH-207	PROTECTED CULTIVATON OF VEGETABLES AND FLOWERS	1+1
DH-223	DRY LAND HORTICULTURE AND WATER SHED MANAGEMENT	2+1
DH-271	HORTICULTURAL EXTENSION, TEACHING METHODS & COMMUNICATION SKILLS	1+1
	TOTAL	9+6
	ALL SEMESTER TOTAL	34+26

DH-101: FUNDAMENTALS OF HORTICULTURE (2+1)

THEORY:

S. No.	Particulars	Lecture No.
1	Definition of horticulture, importance of horticulture in terms of economy,production, employment generation, environmental protection and human resource development. Scope for horticulture in India	1
2	Nutritive value of horticultural crops. Divisions of horticulture with suitable examples and their importance	2
3	Horticultural zones of India, National level horticultural research stations in Indiaand Horticultural research stations in Telangana.	3
4	Vegetable gardens nutrition and kitchen garden, floating garden, vegetable forcing,market gardens and roof gardens	4-5
5	Different Climatic Factors effect on Horticulture crops- Temperature, Light, Relative Humidity and Rainfall.	6-7
6	Effect of unfavourable climatic conditions on Horticultural crops and its management	8
7	Definition of a nursery, different types of nursery beds-flat beds, raised beds andsunken beds, their merits and demerits	9
8	Establishment of orchards – Explanation of points to be kept in mind while selecting of site, land preparation and fencing for the establishment of orchards	10
9	Different steps in establishment of orchards and management of orchards	11
10	Importance of wind breaks, examples and its characteristics.	12
11	Different systems of planting orchards-square, rectangle, quincunx, hexagonal andcontour systems of planting-their merits and demerits	13-14
12	Calculation of planting densities in different systems of planting	15
13	Significance of quality of irrigation water in horticultural crops (SAR, RSC & EC)	16
14	Definition of training, objectives and training, principles and methods of training of fruit crops-open centre, closed centre and modified leader systems their merits anddemerits	17-18
15	Definition of pruning, objectives of pruning, principles and methods of pruning offruit crops.	19-20
16	Flower and fruit drop in orchards-stages, reasons and its management.	21-22
17	Definition of irrigation-Different methods of surface-irrigation followed inhorticultural crops, their merits and demerits	23
18	Drip and sprinkler irrigation-Definition, parts, installation, merits, demerits and itsmanagement.	24-25
19	Definition of manures and fertilizers-different methods of application of manuresand fertilizers to horticultural crops	26
20	Definitions of fruitfulness and unfruitfulness-factors influencing the fruitfulness andunfruitfulness with suitable examples and their management	27
21	Plant growth regulators- definition, functions and classifications	28
22	Practical use of growth regulators in horticulture	29
23	Definition of mulch-objectives of mulching-different types of mulches-organic andinorganic mulches with suitable examples	30
24	Weedicides- definition, classification and study of their usage in horticultural crops	31-32

PRACTICALS:

Sl. No.	Particulars	Exp. No.
1	Identification and uses of tools and implements in Horticulture	1
2	Identify the Horticulture Zones in Map.	2
3	Different types of pots, polythene bags and containers used for seed growing.	3
4	Preparation of potting mixture.	4
5	Repotting and Depotting.	5-6
6	Types of different planting systems.	7
7	Layout, digging of pits and planting	8
8	Transplanting- Precautions.	9
9	Study of different Irrigation methods in horticultural crops.	10
10	Study of different Training methods in horticultural crops.	11
11	Study of different pruning methods in horticultural crops..	12
12	Preparation and application of growth regulators in horticultural crops.	13
13	Different types of mulching methods in horticultural crops.	14
14	Visit to Commercial vegetable, flowers and Fruit orchards.	15
15	Visit to Horticulture Research Station.	16

DH-102 – PLANT PROPAGATION & NURSERY MANAGEMENT (1+2)

THEORY:

Sl. No.	Particulars	Lecture No.
1	Propagation-Definition, principles and types.	1
2	Sexual propagation - definition, importance, advantages and disadvantages.	2
3	Vegetative propagation-definition, importance, advantages and disadvantages	3
4	Definition and types of media	4
5	Propagation by division – suckers, rhizomes, corms, tubers, cloves and bulbs	5
6	Propagation by layering – definition, importance, merits, demerits and types of layering	6
7	Propagation by cuttings – definition, importance and types of cuttings	7
8	Propagation by budding – definition, importance and types of budding	8-9
9	Propagation by grafting – definition, importance and types of grafting. Definitionof rootstock and scion. Characteristics of scion.	10-11
10	Role of Rootstocks and different types of suitable rootstocks for fruit crops.	12
11	Nursery- definition, importance and types	13
12	Factors effecting layout of commercial nursery- selection of site, land preparation,climate, irrigation and fertilizer.	14
13	Nursery management and Good Characteristics of plants in commercial nursery.	15-16

PRACTICALS:

Sl. No.	Particulars	Exp. No.
1	Seed dormancy – methods to break seeddormancy (Stratification, Scarification, soaking in water, storing in dry condition, chemical treatment and use of growth regulators)	1-3
2	Seed quality tests (Seed germination test, excised embryo test and tetrazolium test)	4-5
3	Use of portrays in horticultural crops cultivation.	6
4	Study of different types of tools and implements used in nursery.	7-9
5	Study of pots and propagation media in nursery	10
6	Nursery beds-preparation and types (Flat, raised and sunken beds)	11
7	Propagation in important fruits and flowers plants	12
8	Uses of growth regulators in propagation of important fruit and flower plants	13-14
9	Different types of cuttings	15
10	Different types of layering	16
11	Different types of Budding and Grafting	17-19
12	Preparation of Layout of commercial nursery.	20-21
13	Visit to commercial nursery in the locality.	22
14	Packing methods of grafted plants and Study of transportation of nursery plants(packing materials and containers).	23-24
15	Study of different divisions and structures of nursery (fencing, roads, buildings,scion block, mother block, seed beds and nursery beds).	25-27
16	Study of protected cultivation structures used for plant propagation (poly house,green houses and shade net houses)	28-30
17	Regulating the climatic conditions for nursery plants.	31
18	Visit to Biotechnology /Tissue culture laboratory.	32

DH-103: OLERICULTURE (2+1)

THEORY:

Sl. No.	Particulars	Lecture No.
1	Olericulture – definition - Area, Production and Productivity of Vegetables in India – India's position in the World Vegetable production, India's contribution to Indian economy-Leading States in Vegetable area, production and Productivity – Export Potential of vegetables.	1
2	Importance and classification of vegetables. Nutritional importance of vegetables	2
3	Vegetable Gardening: Types of vegetables Gardens, Kitchen Garden, marketgarden, Truck Garden, Vegetable Forcing, Garden for Processing, Seed production garden and Floating Garden.	3
4	**Tomato**: Introduction, Origin, Area and Production, Composition and use, Distribution and Export Potential of Tomato: Description of Cultivars Soil and Climate – Method of raising the crop Nursery Vs Direct Sowing, Seed Rate Nursery techniques – Main field preparation, Spacing – Irrigation –Fertilizers, Inter cultivation – Weed Control Mulching. Harvesting and Yield – Grading (4 Grades-Super A, Super, Fancy & Commercial) – Post Harvest Handling and Storage. Seed Extraction methods. Physiological Disorders: Blossom end Rot, Cracking, Cat Face, Puffiness, Sun Scald, Gold Fleck	4-5
5	**Brinjal**: Introduction, Origin, Area and Production, nutritional Composition, Distribution and Export Potential of Brinjal. Production Technology: Soil and Climate; Cultivation; Seed Rate, Seed Treatment and Raising of Nursery, Land Preparation, Transplanting, spacing, Irrigation, Manures and fertilizers- Inter culture, Harvest, Yield and storage.	6-7
6	**Chilli**: Introduction, Origin, Area and Production, Composition and Uses of chilli Distribution and Export Potential of Chilli-Cultivars. Production Technology: Soil and Climate-Methods of raising the crop-Nursery Vs. Direct Sowing, Seed Rate-nursery techniques-Main field preparation-Spacing- Irrigation-nutrition-Fertilizers Scheduling-Inter cultivation. harvesting – For Green Chilli and Dry Chilli, Harvesting and yield- drying and Storage	8-9
7	**Okra:** Introduction, Origin, Area and Production, nutritional composition and uses-Distribution and Export Potential of Okra-cultivars and hybrids. Production Technology: Soil & climate; cultivation; land preparation, sowing season, seed rate, spacing, nutrition, irrigation and inter culture, harvesting & yield, storage; economics and value addition.	10
8	**Lab-Lab (Dolichos) bean** and **French Bean:** Introduction, Origin, Area, Classification: Production Technology: Climate and Soil-cultivars-Seed Rate, Spacing, Nutrition, Irrigation and Inter-cultivation; maturity standards, Harvesting, Yield.	11
9	**Cow pea and Cluster Bean:** Introduction, Origin, Area, Nutritive value and uses, cultivars, cultivation-climate and soil; seed rate sowing, spacing, nutrition, irrigation- harvesting and yield.	12
10	**Garden pea**: Introduction, Origin, Area,cultivars (short, medium and long duration) climate & soil, seed rate, spacing, nutrition, irrigation and inter culture, harvesting & yield.	13

11	Cucurbitaceous family-introduction, characteristics, uses, area andproduction	14
12	**Bottle gourd and Ridge gourd**- Production technology – soil and climate, cultivars – propagation and planting methods – seed rate, spacing, irrigation, nutrient management – Inter culture – Weed Control, Mulching,– maturity indices – harvesting and yield.	15
13	**Cucumber:** production technology –soil and climate-cultivars-propagation and planting methods –seed rate, spacing, irrigation, nutrient management – intercultural operations–Weed control, Mulching,– maturity indices – harvesting and yield.	16
14	**Bitter gourd and spine gourd**- Production technology – soil and climate, cultivars – propagation and planting methods – seed rate, spacing, irrigation, nutrient management – Inter culture – Weed Control, Mulching,– maturity indices – harvesting and yield.	17
15	**Pumpkin and Ash gourd**–Production technology –soil and climate-cultivars-propagation and planting methods –seed rate, spacing, irrigation, nutrient management – inter culture–Weed control, Mulching,– maturity indices – harvesting and yield.	18
16	**Water melon and Musk melon** - Production technology – soil and climate, cultivars – propagation and planting methods – seed rate, spacing, irrigation, nutrient management – Inter culture – Weed Control, Mulching,– maturity indices – harvesting and yield.	19
17	**Ivy gourd and pointed gourd**- Production technology – soil and climate, cultivars – propagation and planting methods – seed rate, spacing, irrigation, nutrient management – Inter culture – Weed Control, Mulching,– maturity indices – harvesting and yield.	20
18	**Amaranthus and Spinach:** Introduction, Origin and –cultivars, soil & climate - land preparation, sowing, seed rate, spacing, irrigation and nutrition, harvesting and yield.	21
19	**Fenugreek and Gogu (***Hibiscus cannabinus***):** Introduction, Origin and –cultivars, soil & climate - land preparation, sowing, seed rate, spacing, irrigation and nutrition, harvesting and yield.	22
20	**Carrot and Beet root:** Introduction, Origin, Area, Production and Cultivars-Production Technology – Soil and climate – seed rate, sowing and spacing, - Irrigation - Nutrition – Inter culture – Harvesting and Yield.	23
21	**Radish and Turnip:** Introduction, Origin, Area, Production and Cultivars-Production Technology – Soil and climate – seed rate, sowing and spacing, - Irrigation - Nutrition – Inter culture – Harvesting and Yield.	24
22	**Cabbage and Cauliflower:** Introduction, Origin, Area and Production, Cultivars-Soil and climate requirements. Production Technology: - Nursery techniques – Seed Rate and nursery sowing. Main field preparation –Transplanting, Spacing, - Irrigation – Nutrition – Inter cultivation –harvestingand Yield, Physical disorders.	25
23	**Potato:** Introduction, Origin, area and production- Cultivars – Soil and climate – propagation and planting- seed rate and spacing, - Irrigation –Nutrition – Inter culture- Harvesting, curing and yield, Storage.	26

24	**Sweet Potato:** Introduction, Origin, area and production- Cultivars – Soil andclimate – propagation and planting- seed rate and spacing, - Irrigation – Nutrition – Inter culture- Harvesting, curing and yield, Storage.	27
25	**Cassava and Tapioca:** Introduction, Origin, area and production- Cultivars –Soil and climate – propagation and planting- seed rate and spacing, -	28
26	**Onion:** Introduction, Origin, history, Area, production and Cultivars – Soil and climate requirements. Production Technology: Propagation, seed Rate and sowing. Main field preparation – Transplanting, Spacing, - Irrigation – Nutrition, Inter cultivation, Harvesting, curing and Yield and Storage Irrigation – Nutrition – Inter culture- Harvesting, curing and yield, Storage.	29
27	**Garlic:** Introduction, Origin, history, Area, production and Cultivars – Soil and climate requirements. Production Technology: Propagation, seed Rate and sowing. Main field preparation – Transplanting, Spacing, - Irrigation – Nutrition, Inter cultivation, Harvesting, curing and Yield and Storage.	30
28	**Curry Leaf:** Introduction, Origin Area and Nutritive value - cultivars soil & climate, cultivation - land preparation, nursery raising-sowing/ Planting, seed rate, spacing, Irrigation, nutrition –harvesting and yield.	31
29	**Drumstick/Moringa:** Introduction, Origin Area and Nutritive value -cultivars soil & climate, cultivation - land preparation, nursery raising-sowing/ Planting, seed rate, spacing, Irrigation, nutrition –harvesting and yield.	32

PRACTICALS:

S.No.	Particulars	Exp. No.
1	Planning and layout of a kitchen garden	1
2	Vegetables nursery grown seedlings.	2
3	Acclimatization of nursery grown seedlings	3
4	Methods of main field preparation	4
5	Different fertilizers application methods	5
6	Different irrigation methods	6
7	Nursery seedling Transplanting to main field	7
8	Thinning and gap filing technique in nursery	8
9	Earthing up to the plants	9
10	Weeding and mulching to the plants	10-11
11	Different harvesting techniques in vegetables	12
12	Grading and storage techniques	13
13	Propagation methods in perennial vegetables	14
14	Visit to vegetable fields	15
15	Visit to vegetable Research Station	16

DH-121: FUNDAMENTALS OF SOIL SCIENCE (1+1)

THEORY:

Sl. No.	Particulars	Lecture No.
1	Introduction: Soil and soil components – mineral matter, Organic matter, water and air, Definition of soil and various concepts of soil, branches of soil science	1
2	Rocks – Classification of rocks based on mode of origin – igneous rocks, sedimentary rocks and metamorphic rocks. Classification of rocks based on silica content.	2
3	Minerals – Definition, origin, chemical composition and classification (Primary,secondary).Primary minerals– quartz,feldspars, micas, pyroxenes, amphiboles and olivines.	3
4	Weathering – Types of weathering, physical weathering of rocks agents of physical weathering and their role. Chemical weathering – Solution, hydration, hydrolysis, carbonation, oxidation and reduction (Brief mention). Biological weathering role flora and fauna in weathering process.	4
5	Pedogenic – processes – Eluvition, illuviation, humification, calcification, laterization, podzolisation, melanisation, salinization and alkalization. Soil profile – Detailed description of a theoretical soil profile.	5
6	Soil physical properties – soil weight, water holding capacity, plasticity,colour. Soil texture – Definition – significance. Various textural classes.	6
7	Soil Structure – Definition, classification based on type, class and grade of soil structure. Factors influencing soil structure. Bulk density, particledensity-definition, factors influencing. Calculation of porosity.	7
8	Soil water-classification (physical and biological). Importance of soil air,water and temperature.	8
9	Soil colloids – Definition. General properties – shape, surface area, electrical charge adsorption, Flocculation, deflocculation, plasticity, cohesion, swelling, shrinkage. Tyndall effect and Brownian movement.	9
10	Ion exchange – Cation and anion exchange capacities of soil. Factors affecting ion exchange capacity of soils. Importance of CEC of soils.	10
11	Soil reaction – pH scale – influence of soil pH on nutrient availability. Soil EC and its importance	11
12	Soil microbes- Rhizobium, Azospirillum, Azotobacter, BGA, VAM, PSB-Importance and uses. Role of soil microbes in Mineralization vs Fixation of nutrients, Nitrogen fixation and carbon nitrogen ratio (C:N)	12
13	Nutrient Elements- Ionic forms of plant nutrients in soil. Arnon's criteria of essentiality – Definition, Classification of essential nutrients. Macro andMicro nutrients and their role in plants.	13
14	Problematic soils- definition and classification (acid and alkali soils)-reasons for formation, physical and chemical properties and their management	14
15	Soil fertility and productivity- definition. Soil fertility management Procedures. Characteristics of soils suitable for fruit crops.	15
16	Soils of Telangana- types, properties and suitable crops	16

PRACTICALS:

S.No.	Particulars	Exp. No.
1	Introduction of soil science lab and soil testing equipments. Preparationof standard solutions (molar, normal, ppm and percentage).	1
2	Study of soil sampling implements (Augers etc) and uses.	2
3	Collection of soil samples in the fields and their preparation for soil analysis.	3
4	Determination of mechanical composition of soil (Soil texture) using Bouyoucos Hydrometer and feel method.	4
5	Determination of soil bulk density.	5
6	Determination of soil moisture content by gravimetric method and Tensiometer method.	6
7	Determination of soil pH and electrical conductivity of soils.	7
8	Estimation of organic carbon content in soil.	8
9	Estimation of Major Nutrients (N, P, K).	9-11
10	Rapid soil and plant analysis using kits.	12
11	Determination of lime requirement for reclamation of Acid soils.	13
12	Determination of gypsum requirement for reclamation of Alkali soils.	14
13	Visit to the soil testing laboratory.	15
14	Visit to the fields having problematic soils.	16

DH-151: FARM POWER, AGRICULTURAL MACHINERY AND FARM STRUCTURES (1+1)

THEORY:

Sl. No.	Particulars	Lecture No.
1	Agricultural Energy Resources - advantages and disadvantages of Human Energy, animal energy, wind Energy, Mechanical Energy, Electric Energy,Various Energy Resources	1
2	Agricultural engines - types, key components of the engine and their functions	2
3	Internal Compression Engine - Four Stroke Cycle - Petrol and Diesel EngineOperation and their Differences	3
4	Tractor - Types, their uses, agricultural tractors, tractor components, varioustypes of gear	4-5
5	Tractors - Maintenance (Weekly, Monthly and Yearly), Minor Repairs, PowerTiller - Parts, Uses, Issues	6
6	Farm implements - primary ploughing implements, mould board plough (MB plough) main parts, plough accessories, various types of mould boards. Disc plough - advantages, intersection angles	7-8
7	Secondary Ploughing Tools - Tooth, Cultivator, Rotavator, guntaka, bund,Farming Board, Ridge plough, plough repair and maintenance	9
8	Seed sowing equipment - gorru, parts and working method, types of weedcontrol tools	10
9	Plant Protection Equipment - Dusters, Types and dusting Procedures, Sprayers -Main Functions, Types and spraying Procedures, Precautions to be taken while spraying	11
10	Harvesting equipments - Mango, Sapota harvesting equipments, Dapolichikkamworking method - Processing, Post-Harvesting Tools in Horticultural Crops -Blanchers, Cleaners, Graders, Coloring Sorters	12
11	Refrigeration Methods - Room Cooling, Forced Air Cooling, Hydro Cooling,Vacuum Cooling, Top Icing, Field Structures - Zero Energy Cold chamber, Cold Storage - Classification, Operating System, Benefits	13-14
12	Greenhouse technology - construction, operation - management (climatecontrol), varieties, use in horticultural crops	15-16

PRACTICALS:

S.No.	Particulars	Exp. No.
1	Study the various systems in the tractor, their working modes, engine start andstop and attachment of other tools to the tractor	1
2	Assessing the working of tractors, their maintenance, cost of operation and theirsuitability for various agricultural works	2
3	Power Tiller Working principle, Engine Enabling, stop and attachment of other tools.	3-4
4	Performance study of Mould Board Plough, disc plough and their components	5
5	Study of harrows and seed drills in field	6
6	Study of hand tools (khurpi, shovel, cycle)	7
7	Study of harvesting tools - Mango, sapota harvesting equipment	8
8	Study of blanching, washing, peeling, slicing, cutting tools	9
9	Study of juice making, filling, bottling and sealing equipment	10
10	Visit to cold storages, fruit and vegetable processing plants	11-13
11	Modern horticultural tools - their maintenance	14-15
12	Farm machinery field visit	16

DH-171: FARM MANAGEMENT, AGRICULTURAL FINANCE AND MARKETING (2+1)

THEORY:

S.No..	Particulars	Lecture No.
1	Definition of field credit - Characteristics of Good field credit, Benefits offield credits - Different types of field credits	1
2	Market: Definition, importance of agricultural marketing, classification ofdifferent types of markets	2
3	Market characteristics of Perfect competition and imperfect competition	3-4
4	Agricultural credit/Leverage and Classification of Agricultural Workers	5-6
5	Errors, problems, preventive measures in the agricultural marketingsystem,	7
6	Regular / Regulated Market - Definition, Objectives, Functions and Benefits.	8
7	Cooperative Marketing - NAFED, MARKFED Marketing SystemImportance, Functions	9
8	Minimum Support Price - Definition, objective, Benefits to farmers due toMinimum support price for various crops	10
9	Single window - definition, objectives, functions and benefits.	11
10	Warehousing Corporation - State and Central Warehousing Corporation - Objectives, Functions and Benefits.	12
11	Food Corporation of India (FCI)- Functions and Benefits	13
12	Credit raising schemes for the weaker Sections - Lead Bank Scheme,Differential Interest Rates Scheme (DIR) Objectives, goals and Benefits	14-15
13	Prime Minister's Kisan Man DhanYojana, ParamparagatKrishiVikasYojana – objectives, Importance and Benefits	16-17
14	Integrated Rural Development programme (IRDP) - Importance, Benefitsand Functions	18
15	Large Leverage Institutions - Reserve Bank of India (RBI), National Bank for Agriculture and Rural Development (NABARD) - Their Role in Agricultural Development	19-20
16	SwarnaJayantiGramaSwarojgarYojana - Objectives goals and Benefits	21
17	PradhanMantriKrishiSinchayeeYojana (PMKSY) - purpose, benefits	22
18	Crop Loan Scheme - Definition, Importance, Benefits, Crop InsuranceScheme - Prime Minister's Crop Insurance Scheme (PMFBY) – Importance, Benefits	23-24
19	Commercial banks, nationalization and role of regional rural banks inagricultural finance.	25-26
20	Kisan credit card and soil health card scheme	27
21	World trade organization - functions	28
22	e-NAM - Objectives and goals	29
23	Rythubandhu Scheme Objectives and goals	30
24	Farmer club structure, uses	31
25	Co-operative societies structure, functions and benefits	32

PRACTICALS:

S.No.	Particulars	Exp. No.
1	Management of field finance	1
2	Balance sheet for cultivation of important horticultural crops	2-3
3	Making field account Plans - Making field credit requirements	4-5
4	Calculating different types of repayment methods	6-7
5	Visit to various credit institutions - Commercial Bank, Co-operative Bank,National Agricultural and Rural Development Banks	8
6	Different agricultural processing units	9-10
7	Visit to progressive farmers fields	11
8	Visit to rythu bazaar	12
9	Visit to Seed Production Units - Visit to National Seed ProductionCorporation and Private Units	13-14
10	Visit to APEDA	15
11	Finding ways to sell a variety of important agricultural products andcalculating prices, profits, and costs at different stages	16

DH-104: TROPICAL FRUIT CULTURE (2+1)

THEORY:

S.No..	Particulars	Lecture No.
1	Mango - Introduction & History, Importance, Nutritional Values, Uses, Origin,area of expansion, Export and Import Countries.	1
2	Mango- Subspecies and Varieties, Exportable Varieties, Commercial Varieties - Table Varieties, Juice Varieties, pickle Varieties, Mango Hybrids released forcultivation across India.	2
3	Mango – Root stocks, Propagation techniques, high density planting, climate andsoil.	3
4	Mango - Planting methods, training and pruning.	4
5	Mango - Fertilizer, Irrigation, Inter cropping, Inter cultivation, flowering, fruitsetting, fruit dropping - Prevention.	5
6	Mango- maturity indices, precautions to be taken before harvest and fruiting.	6
7	Mango- grading, packing for domestic and foreign marketing and storage.	7
8	Banana - Introduction & History, Importance, Nutritional Values, Uses, Originand Distribution, Exporting and Importing Countries.	8
9	Bananas - subspecies and varieties, description.	9
10	Banana - climate, soil, propagation, planting methods, fertilizers, irrigation.	10
11	Bananas – Inter cultivation, harvesting, yield, packing, transportation, storage.	11
12	Citrus spp - Introduction & History, Importance, Nutritional Values, Uses, Originand Expansion, Exporting and Importing Countries.	12
13	Citrus spp - taxonomy, subspecies and varieties.	13
14	Citrus spp - Climate, soils, rootstocks, planting techniques.	14
15	Citrus spp - training and pruning, fertilizer, irrigation.	15
16	Citrus spp - Bahar Treatment, Intercropping, Cutting, Yield, Packing, Transport,Storage.	16
17	Pineapple - Introduction & History, Importance, Nutritional Values, Uses, Originand Expansion, Exporting and Importing Countries.	17
18	Pineapple - varieties, different propagation methods..	18
19	Pineapple – Climate, soils, fertilizers, irrigation, inter cultivation, flowering andfruit development, Use of growth regulators.	19
20	Pineapple - harvesting, yield, packing, transport, storage.	20
21	Guava - Introduction & History, Importance, Nutritional Values, Uses, Originand Expansion, Exporting and Importing Countries.	21
22	Guava – varieties description, propagation	22
23	Guava - Climate, soils, fertilizers, irrigation, inter cultivation bahar treatment.	23
24	Guava - harvesting, yield, packing, transport, storage.	24
25	Papaya - Introduction & History, Importance, Nutritional Values, Uses, Originand Distribution, Exporting and Importing Countries.	25
26	Papaya - Climate, soils, fertilizers, irrigation.	26
27	Papaya – Inter cultivation, harvesting, yield, packing, transportation, storage.	27
28	Papaya - Papain extraction.	28
29	Sapota - Introduction & History, Importance, Nutritional Values, Uses, Originand Expansion, Exporting, Importing Countries.	29
30	Sapota - propagation, rootstocks, varieties description.	30
31	Sapota - Climate, soils, fertilizers, irrigation, inter cultivation.	31
32	Sapota – maturity indices, harvesting, yield, packing, transport, storage.	32

PRACTICALS :

S.No.	Particulars	Exp. No.
1	Differentiation and identification of different types of mangoes	1
2	Identifying the different citrus species	2
3	Classification and identification of banana varieties	3
4	Propagation of commercial types of mangoes	4
5	Description of commercial varieties of bananas	5
6	Visit to the commercial orchards	6
7	Identification of papaya varieties	7
8	Description of the commercial types of guava and sapota	8
9	Method of extracting papain from papaya fruits	9
10	Estimating the Cost and Revenue of Commercial Orchards	10
11	Description and propagation of pineapple varieties	11
12	Propagation in mango, banana and citrus species	12
13	Propagation in guava and sapota	13
14	Visit to local fruit markets	14
15	Visit to cold storage	15
16	Knowing the ripening of fruits	16

DH-105 – SPICES AND PLANTATION CROPS (2+1)

THEORY:

S.No.	Particulars	Lecture No.
1	Introduction, origin and cultivated area of spices	1
2	Botanical classification and importance of spices	2
3	Pepper - Introduction, importance, sub species, varieties and propagation	3
4	Pepper – Cuttings, selection for planting, climate, soils, planting techniques, post-planting care, fertilizers, cropping techniques, training and pruning	4
5	Pepper - flowering, fruit setting, fruiting, maturity stage, harvesting, refiningmethods, marketing and making of value adding by-products.	5
6	Cardamom - Introduction, Significance, Sub species, varieties propagation	6
7	Cardamom - Cuttings selection for planting, climate, soils, planting techniques, post-planting care, fertilizers, cropping techniques, training and pruning	7
8	Cardamom - flowering, fruit setting, fruiting, maturity stage, harvesting, refiningmethods, marketing and making of value adding by-products.	8
9	Turmeric - Introduction, importance, sub species, varieties, propagation.	9
10	Turmeric - Cuttings selection for planting, climate, soils, planting techniques, post-planting care, fertilizers, cropping techniques, training and pruning	10
11	Turmeric – Harvesting, refining techniques, marketing and making of value-addedproducts.	11
12	Ginger - Introduction, Significance, Species, Varieties, Propagation.	12
13	Ginger - cuttings selection for planting, climate, soils, planting techniques, post-planting care, fertilizers, cropping techniques, training and pruning	13
14	Ginger – Harvesting, refining techniques, marketing and making of value-addedproducts.	14

15	Coriander - Introduction, Significance, Varieties, propagation, Climate, Soils, Fertilizers, Crop Cultivation methods, Harvesting, Marketing and Value addition ofProducts.	15
16	Fenugreek - Introduction, importance, sub species, varieties, propagation, climate, soils, fertilizers, cultivation methods, harvesting, marketing and making of valueadded products.	16
17	Ajwain - Introduction, Importance, varieties, propagation, climate, Soils, Fertilizers,Crop cultivations methods, harvesting, refining, marketing	17
18	Introduction to plantation crops, importance and area of expansion	18
19	Coconut - Introduction, importance, subspecies, varieties, propagation, seed selectionfor planting climate, soils, and techniques in planting and precautions after planting.	19
20	Coconut - Fertilizers, cultivation methods, harvesting, marketing and making of valueadded products	20
21	Cashewnut - Importance, subspecies, varieties, propagation, climate, soils, fertilizers,cultivation techniques, training and pruning.	21
22	Cashewnut - Refining techniques, marketing and making of value added products	22
23	Oil palm - Importance, sub spices, varieties, propagation, climate, soils, fertilizers.	23
24	Oil palm- Cultivation techniques, training and pruning, harvesting, marketing	24
25	Betelvine - Significance, Species, Varieties, propagation, Climate, Soils, Fertilizers, Cultivation Techniques, Training and Pruning,	25
26	Betelvine - Harvesting, refining techniques, marketing and making of value-added by-products.	26

27	Betel leaf - Importance, subspecies, varieties, propagation, selection of vines, climate, soils, fertilizers.	27
28	Betel leaf - crop cultivation techniques, training and pruning, harvesting and marketing.	28
29	Cocoa - Importance, subspecies, varieties, propagation, climate, soils, fertilizers,cropping techniques, training and pruning, harvesting and marketing.	29
30	Coffee - Importance, subspecies, varieties, propagation, climate, soils, fertilizers,cropping techniques, training and pruning, harvesting and marketing.	30
31	Palm - Introduction, Significance, Species, Varieties, propagation, Seed Selection,Climate, Soils	31
32	Palm tree - Planting techniques, post-planting precautions, fertilizers, cultivationmethods, harvesting, and marketing.	32

PRACTICALS:

S.No.	Particulars	Exp. No.
1	Spices- Description and identification of different sub species and types	1
2	Important spice propagation methods (pepper and cardamom)	2
3	Method of storing turmeric and ginger seed tubers	3
4	Turmeric refining method	4
5	Ginger refining method	5
6	Visiting the spice gardens	6
7	Description of coconut varieties and identification	7
8	Seed coconut Selection Method, nursery beds preparation	8
9	Description of cashew nut varieties and identification	9
10	Cashewnut refining, grading and packing	10
11	Propagation and nursery development in cultivation of palm oil	11
12	Description of beetle nut varieties and propagation	12
13	Description of beetle leaf varieties , propagation and training	13
14	Cashew nut Processing Method	14
15	Palm oil refining procedure	15
16	Cocoa refining process	16

DH-106: VALUE ADDED PRODUCTS OF FRUITS AND VEGETABLES (1+1)

THEORY:

S.No.	Particulars	Lecture No.
1	Importance of manufacturing industries that add value to fruits and vegetables	1
2	Study of process of making various products with fruits and vegetables, FPO and FSSAI importance	2
3	Jam - preparation process, diagnostic methods, problems encountered in the preparation	3
4	Jelly - Preparation Method, Pectin Importance, Pectin Determination Methods, Jelly Determination Methods, Problems In Preparation	4
5	Marmalade - Jam marmalade, jelly marmalade preparation process	5
6	Crystallized Fruit, Glazed Fruit Preparation Method	6
7	Preserve and candies preparation process, problems encountered in preparation	7
8	Fermented Beverages - Sector, RTS, Syrup, Fresh Fruit Juice Process	8
9	Fermented Beverages – preparation of different types of wines and storage	9
10	Cordial, squash preparation and storage	10
11	Procedure for making tomato sauce and ketchup, problems encountered	11
12	Problems encountered in the preparation of chutneys and pickles	12
13	Tooty Fruity making procedure	13
14	Chemicals used in the storage of fruits and vegetable products	14
15	Canning - definition, processing methods, equipments used, cans and utensils, quality of canning materials and their defects	15
16	Reasons for spoilage of processed materials and their preventive measures	16

PRACTICALS:

S.No.	Particulars	Exp. No.
1	Identification of equipment and machinery required for making fruit andvegetable products	1
2	Method of making jam	2
3	Jelly making method	3
4	Marmalade making method	4
5	Method of making candies	5
6	Method of making sugar syrup	6
7	Method of making cordials	7
8	Method of making squash	8
9	Fermented beverage making method	9
10	Amchur preparation method	10
11	Method of making chutney	11
12	Pickle making method	12
13	Method of sauce making	13
14	Ketchup preparation method	14
15	Tooty fruity making procedure	15
16	Visit to processing unit	16

DH-122: MANURES AND FERTILIZERS (1+1)

THEORY:

S.No.	Particulars	Lecture No.
1	Organic manures- Definition, characteristics and Classification of manures. Chemical fertilizers- definition and Classification, Differences between organicmanures and chemical fertilizers.	1
2	Bulky organic manures: Preparation Methods of FYM, compost, vermicompost– characteristics and their nutrient compositions	2-3
3	Concentrated organic manures-blood meal, bone meal, horn meal, meat meal,fish meal, guano & oil cakes.	4
4	Green manures– Classification with examples and suitability to different soils.Advantages and limitations of green manuring and green leaf manure.	5
5	Biogas plant: Structure and Principles of operation and its advantages (effluentused as manure)	6
6	Nitrogenous fertilizers- Definition, Classification (Amide group, Nitrate Group, Ammonical Group, Nitrate and Ammonical Group)–Nutrient content, propertiesand suitability to different soils and crops.	7-8
7	Phosphatic fertilizers- Definition, Classification (Water soluble, Citrate soluble,insoluble)–Nutrient content, properties and suitability to different soils and crops.	9
8	Potassic fertilizers: Definition and properties of potassic fertilizers – KCL andK2SO4, Nutrient content, and suitability to different soils and crops.	10
9	Secondary Nutrients- Sources of Calcium, Magnesium and Sulphur, Nutrientcontent, properties and suitability to different soils and crops.	11
10	Micronutrients- Importance, Conditions leading to deficiencies, sources of Zn,Fe, Mn, Cu, B and Mo. Deficiency symptoms and their corrections.	12-13
11	Compound and complex fertilizers Used in India – MAP, DAP, APS, APP andNPK complexes. Factors influencing in Fertilizers Use Efficiency.	14
12	Bio-fertilizers- definition, characteristics, classification and its uses.	15
13	Integrated Nutrient Management (INM): For important Horticultural Crops	16

PRACTICALS:

S.No.	Particulars	Exp. No.
1	Study of Physical properties of manure and fertilizers.	1
2	Sampling of organic manures and fertilizers for chemical analysis	2
3	Study of green manure crops and cultivation of green manure crops in the field	3-4
4	Preparation and study of FYM	5
5	Preparation of Compost with agricultural wastes	6
6	Visit to municipal compost yard	7
7	Preparation and study of vermicompost	8
8	Visit to Vermicomposting unit	9
9	Calculation of quantity and doses of primary nutrients (N, P, K) application tothe horticultural crops	10
10	Calculation of quantity of complex fertilizers (DAP) application to thehorticultural crops	11
11	Precautionary measures to be followed during application and storage offertilizers	12
12	Visit to fertilizer testing laboratory	13
13	Visit to the horticultural fields for identification of nutrient deficiencysymptoms	14-16

DH: 141: DISEASES OF HORTICULTURAL CROPS AND THEIR MANAGEMENT (2+1)
THEORY:

S.No..	Particulars	Lecture No.
1	Introduction to plant pathology, Definition, branches. Terms and conceptsused in plant pathology.	1
2	Fungicide-Meaning, classification of fungicides based on mode of action,usage, form and chemical structure	2
3	Diseases of Mango: Malformation, Anthracnose, Powdery Mildew, SootyMould, Die back, Black Tip, Red rust, stem parasite, chloride injury	3 & 4
4	Diseases of Citrus: Gummosis, Twig blight, ganoderma, powdery mildew,canker, tristeza, greening, viral diseases	5 & 6
5	Diseases of Banana: panama wilt, sigatoka leaf spot, cigar end rot, bunchytop	7 & 8
6	Diseases of Grapevine: Anthracnose, Downey mildew, powdery mildew,rust	9 & 10
7	Diseases of Guava: Canker, wilt, anthracnose, red rust	11
8	Diseases of Sapota: Leaf spots, flat limb	12
9	Diseases of Papaya: Damping off/ foot rot, mosaic, ring spot	13
10	Diseases of Pomegranate: Cercospora leaf spot, Anthracnose, bacterial leafblight	14
11	Diseases of Coconut and Oil palm: bud rot, ganoderma, stem bleeding,tatipaka, Nursery leaf spots, bunch rot	15
12	Diseases of Coffee, Cashewnut, Pepper: rust, anthracnose, pollu disease,foot rot	16
13	Diseases of Tomato: Early blight, damping off, cercospora leaf spot,septoria leaf spot, anthracnose, spotted wilt, blossom end rot	17 & 18
14	Diseases of Brinjal: Damping off, cercospora leaf spot, alterneria leaf spot,little leaf	19
15	Diseases of Chilli: Damping off, anthracnose, powdery mildew, cercosporaleaf spot, alternaria blight, bacterial wilt, leaf curl, mosaic	20 & 21
16	Diseases of Bhendi: Powdery mildew, yellow vein mosaic	22
17	Diseases of Crucifers: Damping off and wire stem, club root, white rust,black rot, powdery mildew, alternaria leaf spot	23
18	Diseases of Beans: Rust, powdery mildew, anthracnose	24
19	Diseases of Potato: Late blight, early blight, scab, wart, leaf roll	25
20	Diseases of Cucurbits: powdery mildew, downy mildew, cercosporaleafspot, fruit rot, wilt, anthracnose	26
21	Diseases of Onion: leaf blight, smut, smudge	27
22	Diseases of Turmeric: leaf spot, leaf blotch, rhizome rot	28
23	Diseases of Coriander: Powdery mildew	29
24	Diseases of Rose: Die back, powdery mildew, black spot	30
25	Diseases of Jasmine, Chrysanthemum, Aster: Rust, cercospora leaf spot,stunt, aster yellow	31
26	Integrated Disease Management	32

PRACTICALS :

S.No.	Particulars	Exp. No.
1	Use of Microscope-Study	1
2	Diseases of Citrus	2
3	Diseases of Mango	3
4	Diseases of Guava, Sapota, Grapevine	4
5	Diseases of Banana, papaya	5
6	Diseases of Ber, Pomeganate	6
7	Diseases of Chilli, tomato, brinjal and okra	7
8	Diseases of potato, onion, coriander	8
9	Diseases of Cruciferous vegetables	9
10	Diseases of Cucurbitaceous vegetables	10
11	Diseases of Turmeric, Ginger	11
12	Diseases of Coconut, Oilpalm	12
13	Diseases of Rose, Chrysanthemum, Jasmine, Marigold	13
14	Diseases of crossandra, aster, gladiolus,	14
15	Study of common fungicides used in plant disease control	15
16	Calibration of Fungicide dosage	16

DH-152: SOIL AND WATER ENGINEERING (1+1)

THEORY:

S.No.	Particulars	Lecture No.
1	Methods and types of area estimation in ornamental, vegetable and fruit crops.	1
2	Chain survey, trigonometric survey, area calculation of regular and irregularshape fields used for horticultural crops.	2-4
3	Land leveling- Definition and types.	5
4	Water lifting devices, types of pumps- characteristics and design of centrifugalpump, submersible pump and turbines.	6-8
5	Methods of quantification of the water flow in pipes and open channels.	9
6	Irrigation methods – surface irrigation- definition and types.	10
7	Sprinkler and drip irrigation, Fertigation-merits and demerits	11-12
8	Soil erosion – types (water and wind erosion)-factors affecting soil erosion,measures to control soil erosion.	13
9	Importance and management of Water harvesting structures - Desilting of theponds.	14
10	Soil and water conservation technology. Practices for Improving water useefficiency.	15-16

PRACTICAL:

S.No.	Particulars	Exp. No.
1	Study of equipment used in soil surveying	1
2	Estimation of land through chain surveying	2
3	Chain trigonometric surveying in fields	3
4	Cross staff surveying	4
5	Area calculation by designing the trigonometric survey details	5
6	Area calculation by designing the cross staff survey details	6
7	Area calculation of regular and irregular shape fields	7
8	Study of equipment used in Land leveling	8
9	Land leveling study at field level.	9
10	Centrifugal pumps design and management	10
11	Study of Submersible pumps and Turbines design	11
12	Methods of volume estimation of water flow	12
13	Study of water flow quantification equipment (weirs, water meter andcurrent meter)	13
14	Visit to fields with sprinkler and drip irrigation systems	14
15	Installation, protection and management of sprinkler and drip irrigationsystems.	15-16

DH-201 – SUB TROPICAL AND ARID FRUIT CULTURE (2+1)

THEORY:

S.No.	Particulars	Lecture No.
1	Definition and importance of orchards in sub tropical and arid regions.	1-2
2	Grapes - origin, nutritional value, taxonomy, identification of different species andvarieties	3
3	Grapes - Suitable climate, Soils, Roots, stocks, propagation, planting Techniques,Training, Pruning,	4
4	Grapes – Rootstocks, propagation, planting methods, training, pruning, Fertilizer management, Irrigation, Problems in Cultivation, flowering and fruiting, harvesting indices, Yield, Grading, Packing Transport and Storage Methods.	5
5	Pomegranate - origin, nutritional value, taxonomy, identification of different species and varieties	6
6	Pomegranate - Suitable climate, Soils, Roots, stocks, propagation, planting Techniques, Training, Pruning,	7
7	Pomegranate – Fertilizer management, Irrigation, Problems in Cultivation, flowering and fruiting, harvesting indices, Yield, Grading, Packing Transport andStorage Methods.	8
8	Ber - origin, nutritional value, taxonomy, identification of different species and varieties	9
9	Ber- Suitable climate, Soils, Roots, stocks, propagation, planting Techniques, Training, Pruning,	10
10	Ber –Fertilizer management, Irrigation, Problems in Cultivation, flowering and fruiting, harvesting indices, Yield, Grading, Packing Transport and Storage Methods.	11
11	Litchi - origin, nutritional value, taxonomy, identification of different species andvarieties, climate, soils, rootstocks and propagation	12
12	Litchi – Planting methods, training, pruning, Fertilizer management, Irrigation, Problems in Cultivation, flowering and fruiting, harvesting indices, Yield, Grading, Packing Transport and Storage Methods.	13
13	Amla - origin, nutritional value, taxonomy, identification of different species and varieties, climate and soils	14
14	Amla – rootstocks, propagation, planting methods, training, pruning, Fertilizer management, Irrigation, Problems in Cultivation, flowering and fruiting, harvesting indices, Yield, Grading, Packing Transport and Storage Methods.	15
15	Jamun - origin, nutritional value, taxonomy, identification of different species andvarieties, climate, soils, rootstocks and propagation	16
16	Jamun - Planting methods, training, pruning, Fertilizer management, Irrigation, Problems in Cultivation, flowering and fruiting, harvesting indices, Yield, Grading, Packing Transport and Storage Methods.	17
17	Custard apple - origin, nutritional value, taxonomy, identification of different species and varieties	18
18	Custard apple - Suitable climate, Soils, Roots, stocks, propagation, planting Techniques, Training and Pruning,	19

19	Custard apple – Fertilizer management, Irrigation, Problems in Cultivation, flowering and fruiting, harvesting indices, Yield, Grading, Packing Transport and Storage Methods.	20
20	Fig - Origin, nutritional value, taxonomy, identification of different species and varieties, climate and soils	21
21	Fig – Rootstocks, propagation, planting methods, training, pruning, Fertilizer management, Irrigation, Problems in Cultivation, flowering and fruiting, harvesting indices, Yield, Grading, Packing Transport and Storage Methods.	22
22	Phalsa - Origin, nutritional value, taxonomy, identification of different species and varieties, climate, soils, rootstocks and propagation methods	23
23	Phalsa - Planting methods, training, pruning, Fertilizer management, Irrigation, Problems in Cultivation, flowering and fruiting, harvesting indices, Yield, Grading, Packing Transport and Storage Methods.	24
24	Tamarind - Origin, nutritional value, taxonomy, identification of different species and varieties, climate, soils, rootstocks and propagation methods	25
25	Tamarind – Planting methods, training, pruning, Fertilizer management, Irrigation, Problems in Cultivation, flowering and fruiting, harvesting indices, Yield, Grading, Packing Transport and Storage Methods.	26
26	Passion fruit - Origin, nutritional value, taxonomy, identification of different species and varieties	27
27	Passion fruit - Suitable climate, Soils, Roots, stocks, propagation, planting Techniques, Training, Pruning,	28
28	Passion fruit - Fertilizer management, Irrigation, Problems in Cultivation, flowering and fruiting, harvesting indices, Yield, Grading, Packing Transport and Storage Methods.	29
29	Karonda - Origin, nutritional value, taxonomy, identification of different species and varieties	30
30	Karonda - Suitable climate, Soils, Roots, stocks, propagation, planting Techniques, Training, Pruning,	31
31	Karonda - Fertilizer management, Irrigation, Problems in Cultivation, flowering and fruiting, harvesting indices, Yield, Grading, Packing Transport and Storage Methods.	32

PRACTICALS:

S.No.	Particulars	Exp. No.
1	Description of grape varieties.	1
2	Description of ber varieties.	2
3	Description of annonaceae family fruits.	3
4	Identification and description of pomegranate varieties	4
5	Description of amla and tamarind varieties	5
6	Training and pruning in grapes	6
7	Training and pruning in ber	7
8	Training and pruning in pomegranate	8
9	Pruning in phalsa	9
10	Methods of flowering and fruiting in ber	10
11	Propagation in jamun	11
12	Propagation methods in amla	12
13	Propagation methods in fig	13
14	Description of fig varieties	14
15	Identification and description of litchi, passion fruit and karonda varieties	15
16	Visit to the local orchards of the arid regions.	16

DH-202: COMMERCIAL FLORICULTURE (2+1)

THEORY:

S.No..	Particulars	Lecture No.
1	Scope and importance of commercial floriculture in India. Present status, Futureprospects and strategies needed for improvement. Area,production and exports.	1
2	**Rose:** Introduction, origin and distribution, classification, species and varieties, climate and soil requirements, propagation – Rootstocks, Stock scion compatibility, land preparation, planting, Manures and fertilizers, cultural operations (pruning, pinching and mulching) and Special cultural operations (Disbudding and Desuckering) use of growth regulators, physiological disorders, harvesting, post harvest management, yield androse bi-products – Loose flower production.	2-5
3	**Jasmine:** Introduction, origin and distribution, classification, species and varieties, climate and soil requirements, propagation, land preparation, planting, Manures and fertilizers, cultural operations, use of growth regulators, harvesting, post harvest management and yield. Extraction ofessential oil (Steam Distillation and Solvent Extraction).	6-9
4	**Crossandra:** Introduction, origin and distribution, species and varieties, climate and soil requirements, propagation, land preparation, planting, Manures and fertilizers, cultural operations (Weeding and Earthing up), use of growth regulators, harvesting, post harvest management and yield.	10-11
5	**Chrysanthemum**: Introduction, origin and distribution, classification, species and varieties, climate and soil requirements, propagation, land preparation, planting, Manures and fertilizers, cultural operations, (staking, desuckering, pinching and disbudding) use of growth regulators,harvesting, post harvest management and yield.	12-14
6	**Marigold:** Introduction, origin and distribution, species and varieties, climate and soil requirements, propagation, land preparation, planting, Manures and fertilizers, cultural operations, (pinching and disbudding)use of growth regulators, harvesting, post harvest management and yield.	15-16
7	**Gladiolus:** Introduction, origin and distribution, classification of varieties, species and varieties, climate and soil requirements, propagation, land preparation, planting, Manures and fertilizers, cultural operations, use of growth regulators, physiological disorders, harvesting,post harvest management and yield.	17-18
8	**Tuberose:** Introduction, origin and distribution, classification, species and varieties, climate and soil requirements, propagation, land preparation, planting, Manures and fertilizers, cultural operations, use ofgrowth regulators, harvesting, post harvest management and yield.	19-20

9	**China aster:** Introduction, origin and distribution, classification, species and varieties, climate and soil requirements, propagation, land preparation, planting, Manures and fertilizers, cultural operations, (pinching and disbudding) use of growth regulators, harvesting, post harvest management and yield.	21
10	**Anthurium:** Introduction, origin and distribution, classification, species and varieties, climate and shade requirements, growing media, propagation, systems of growing, planting, fertigation, cultural operations, de-suckering, defoliation, use of growthregulators,physiological disorders, harvesting, grades, post harvest management and yield.	22-23
11	**Carnation:** Introduction, origin and distribution, classification, species and varieties, climate and soil requirements, propagation, land preparation, planting, Manures and fertilizers, cultural operations, (pinching and disbudding) use of growth regulators, physiologicaldisorders, harvesting, post harvest management and yield.	24-25
12	**Gerbera:** Introduction, origin and distribution, classification, species and varieties, climate and soil requirements, propagation, land preparation, planting, Manures and fertilizers, cultural operations, defoliation, soil loosening, shading, use of growth regulators, physiological disorders,harvesting, post harvest management and yield.	26-27
13	**Dahlia and Gaillardia:** Introduction, origin and distribution, classification, species and varieties, climate and soil requirements, propagation, land preparation, planting, Manures and fertilizers, cultural operations, (pinching and disbudding) use of growth regulators,harvesting, post harvest management and yield.	28-29
14	**Orchids:** Introduction, origin and distribution, classification, species and varieties, climate and growing medial requirements, propagation, orchidarium construction, planting, Manures and fertilizers, cultural operations, physiological disorders, use of growth regulators, harvesting,post harvest management and yield.	30-31
15	Dehydration techniques for drying of flowers – Importance – Dehydration methods – Air drying – Embedding and drying – viz., room drying – Sun drying – hot air oven – vacuum drying – microwave drying – Embedding individual flower – embedding individual flower with stem – Embeddingbranch with flowers – Press drying (simple method, herbarium method).	32

PRACTICALS:

S.No.	Particulars	Exp. No.
1	Identification of important cut flower crops and their description (Rose,Gerbera, Carnation, Anthurium, Tuberose, Gladiolus and Orchid).	1-3
2	Identification of important loose flower crops and their description (Rose,Crossandra, Dahlia, Gaillardia, Jasmine, Marigold, Chrysanthemum).	4-6
3	Study of different Root stocks used in rose and budding.	7-8
4	Training and pruning techniques in Rose.	9
5	Training and pruning techniques in Jasmine.	10
6	Visit to flower market.	11
7	Field visit to commercial flower growing area.	12
8	Visit to Floriculture Research Station	13
9	Decoration of Flower vase.	14
10	Preparation of Flowering bouquet and Garland.	15
11	Drying / Dehydration techniques for flower drying.	16

DH-211: SEED PRODUCTION, CERTIFICATION AND VARIETAL TESTING

THEORY:

S.No..	Particulars	Lecture No.
1	Seed production - Introduction - importance, varieties, hybrids - definition,variety management - Seed quality - Seed technology - Objectives	1
2	Definition of self pollination and cross pollination - main reasons for selfpollination and cross pollination.	2
3	Seed Classes - Complete details of Nucleus, Breeder, Foundation and CertifiedSeed in vegetatively growing Crops.	3
4	Reasons for deterioration of genetic purity in seed of vegetable crops	4
5	General principles in seed production and different types of seed production.	5
6	Soil requirements, isolation distance between the plots and the planting ratio andother important details required for important vegetable crops,	6
7	Definition of roguing - Different roguing techniques	7
8	Management practices before and after harvesting in seed production.	8
9	Packing and storage methods.	9
10	Seed Quality Certification - Purpose, Seed Certification Standards - Duties of theSeed Certification Officer.	10
11	Seed quality determination, features to be considered in determining seed quality.	11
12	Determination of germination percentage by various methods.	12
13	Grow-out test, definition, seed health, seed test results announcement, seedquality testing in crop varieties.	13
14	Different types of Seed Production - Breeder Seed Production, Foundation SeedProduction and Certified Seed Production.	14
15	Seed quality, seed act, new seed policy	15
16	Suitable places for seed production of vegetable crops.	16

PRACTICALS:

S.No.	Particulas	Exp. No.
1	Seed sampling - equipment, seed purification methods in different crops	1
2	Testing the moisture content of different types of seeds	2
3	Seed germination percentage testing.	3
4	Identifying normal and abnormal seeds	4
5	Identification of pure and chaffy seeds in different crops	5
6	Seed and germination tests	6
7	Specific quality reduction tests	7
8	Tetrazolium test details	8
9	Management of seed warehouses	9
10	Working in Seed Processing Factories - Field Inspection	10
11	Roguing in different crops	11
12	Maintaining records at test centers and announcing results	12
13	Seed production in horticultural crops especially soil isolation distancebetween the plants, pollen collection and artificial pollination.	13
14	Maintaining flower nurseries	14
15	Seed production in tomato and brinjal	15
16	Seed production okra and chilli	16
17	Seed production in bulb crops (onion, garlic)	17
18	Seed production root crops	18
19	Seed production leafy vegetables (amaranthus, fenugreek)	19
20	Seed production in cabbage	20
21	Seed production in the cauliflower	21
22	Testing the purity of varieties by the Grow Out test	22
24	Seed production in crossandra, marigold and aster crops	23-25
25	Visiting to Seed Production Centers	26
26	Seed production in creepers	27-28
27	Maintenance of isolation distance between the fields	29
28	Seed production in perennial vegetables (coccinia, moringa)	30
29	Factors Affecting Vegetable Seed Production	31
30	Visit to a seed production industry	32

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

THEORY:

S.No.	Particulars	Lecture No.
1	Introduction to entomology, important characteristics of phylum Arthropoda,class insecta, classification of class insecta	1
2	Study of Characteristics of Orders-Orthoptera,Isoptera, Thysanoptera,Homoptera, Hemiptera, Coleoptera, Lepidoptera, Diptera and Hymenoptera	2 &3
3	Integrated Pest management (IPM)-introduction, definition, concepts of IPM, components of IPM, cultural control, mechanical control, physical control,legislative control, chemical and biological control	4& 5
4	Study of Non insect pests (Mites, wild boar, rodents, monkeys, birds and theirmanagement	6 & 7
5	Study of insect pests (distribution, nomenclature, marks of identification, nature of damage, symptoms of damage and management) of fruit crops (mango, citrus, guava, sapota, banana, papaya, pomegranate, grape, ber), spices and plantation crops (Turmeric, ginger, coconut, cashewnut, oilpalm) vegetables (tomato, brinjal, okra, chilli, beans, cucurbits, crucifers, potato, sweet potato and flowercrops (rose, jasmine, chrysanthemum, marigold)	8-26
6	Insecticide-Definition, classification of insecticides based on mode of entry,mode of action, form and chemical structure	27 & 28
7	Apiculture-importance, meaning. Different species of honey bees	29
8	Different castes of honeybees, biology, their duties, morphological differences,caste determination, communication	30
9	Types of bee hives, their description, equipment and accessories for apiary. Beeproducts, honey extraction	31
10	Diseases of bees-protozoa-nosema, Malpighamoeba , brood diseases, natural enemies of honey bees	32

PRACTICALS:

S.No.	Particulars	Exp. No.
1	Study of Insect collection, storage	1
2	Identification of important insects belonging to prominent orders	2
3	Nature of damage caused by insects in different crops/plants	3
4	Identification of damage symptoms caused by insects in mango	4
5	Identification of damage symptoms caused by insects in citrus	5
6	Identification of damage symptoms caused by insects in guava, sapota, bananaand papaya	6
7	Identification of damage symptoms caused by insects in grape, pomegranateand ber	7
8	Identification of damage symptoms caused by insects in coconut, oilpalm,cashewnut, cocoa	8
9	Identification of damage symptoms caused by insects in tomato, brinjal, okraand chilli	9
10	Identification of damage symptoms caused by insects in cabbage, cauliflowerand cucurbitaceous vegetables	10
11	Identification of damage symptoms caused by insects in beans, potato, sweetPotato and palak	11
12	Identification of damage symptoms caused by insects in rose, jasmine andchrysanthemum	12
13	Study of important insecticides used in pest management	13
14	Study of different honey bee hives and other instruments used in apiary	14
15	Study of use of *Apismellifera*	15
16	Honey extraction	16

DH-232 – FIELD DIAGNOSIS OF HORTICULTURAL CROPS (0+2)

PRACTICAL:

S.No.	Particulars	Exp. No.
1	Study of instruments and equipment required to diagnose diseased, damaged ordisorder symptoms	1
2	Visit to Mango orchard - Identification of damaged, diseased and disorder specimen	2
3	Visit to citrus orchard - Identification of damaged, diseased and disorderspecimen	3
4	Visit to banana orchard- Identification of damaged, diseased and disorderspecimen	4
5	Visit to guava orchard-Identification of damaged, diseased and disorder specimen	5
6	Visit to sapota and papaya orchard -Identification of damaged, diseased anddisorder specimen	6 & 7
7	Visit to grapevine and pomegranate orchard -Identification of damaged, diseasedand disorder specimen	8
8	Visit to tomato, brinjal, okra and chilli fields - Identification of damaged,diseased and disorder specimen	9 & 10
9	Visit to cucurbitaceous vegetable fields - Identification of damaged, diseased anddisorder specimen	11 & 12
10	Visit to leguminous vegetable fields - Identification of damaged, diseased anddisorder specimen	13 & 14
11	Visit to tuber crop vegetable fields - Identification of damaged, diseased anddisorder specimen	15
12	Visit to cruciferous vegetable fields - Identification of damaged, diseased anddisorder specimen	16 & 17
13	Visit to spice crop fields – Identification of damaged, diseased and disorderspecimen	18 & 19
14	Visit to Bulb crop fields - Identification of damaged, diseased and disorderspecimen	20
15	Visit to coriander, fenugreek fields – Identification of damaged, diseased anddisorder specimen	21
16	Visit to plantation crop fields (cashewnut, oil palm, coconut, betalvine)– Identification of damaged, diseased and disorder specimen	22-25
17	Study of physiological disorders in tomato	26
18	Study of physiological disorders in cauliflower and cabbage	27
19	Study of parasites seen in horticultural crops	28
20	Visit to flower crop fields – Identification of damaged, diseased and disorderspecimens	29-32

DH-204: POST HARVEST MANAGEMENT OF HORTICULTURAL CROPS (1+1)

THEORY:

S.No.	Particulars	Lecture No.
1	Post-harvest importance of horticultural crops	1
2	Methods to determine the ripening stage of fruits and vegetables	2
3	Maturity indices of fruits	3
4	Maturity indices of vegetables	4
5	Harvesting, handling and grading	5
6	Pre-harvest factors to reduce post-harvest losses	6
7	Factors that contribute to their quality after harvesting.	7
8	Different types of physical changes that occur during fruit ripening.	8
9	Different types of chemical changes that occur during fruit ripening	9
10	Activities that delay and accelerate fruit ripening.	10
11	Post-harvesting operations	11
12	Causes of flower spoilage after harvesting, factors affecting flower storage capacity.	12
13	Fruit quality standards	13
14	Storage by various methods to local and distance markets.	14
15	Pre packing methods, different packing methods	15
16	Cold storagemethods	16

PRACTICALS:

S.No.	Particulars	Exp. No.
1	Determination of maturity indices of fruits	1
2	Determination of maturity indices of vegetables	2
3	Determination of the ripening stage in flowers	3
4	Physiological loss in weight and quality deterioration processes	4-6
5	Grading in fruits	7
6	Grading in vegetables and flowers	8
7	Post harvest management activities	9-10
8	Study of different packing methods	11
9	Study of different storage methods	12
10	Physical deficiencies seen after harvesting in horticultural crops	13-14
11	Visit to cold storage unit	15
12	Visit to polyhouses	16

DH-205 – ORNAMENTAL GARDENING AND LANDSCAPE ARCHITECTURE (2+1)

THEORY:

S.No.	Particulars	Lecture No.
1	Importance and Definition of landscape and landscaping gardening.	1-2
2	Types of Gardens, Study of formal gardens *i.e.,* Mughal, Persian, Italian and French gardens with their different features.	3-5
3	Informal gardens *i.e.,* English garden and Japanese (Hill, flat, tea, passage andsand gardens) with their different features	6-7
4	Lawn- Definition, factors to be remembered in layout of lawn, planting methods,management and suitable grass species.	8-9
5	Garden components or features , Lawn, Fences, Gates, Steps, Paths, Arches, Pergolas, Hedges, Edges, Flower bed, Carpet beds, Borders, Fountains, Statues, Shrubs, waterfall, Topiary, Fern house/conservatory, Orchid, Lily pools, Rockery, Avenue trees, Solitary/Specimen plants, Pot gallery, Terrace andMounds.	10-12
6	Indoor plants-Definition, importance and types, factors affecting growth of indoorplants (light, temperature, humidity and irrigation).	13-14
7	Bonsai-Definition and importance. Different types of bonsai methods (formal upright, informal upright, slanting, gnarled, cascade, semi-cascade).	15-16
8	Study of landscaping in houses, schools and government offices.	17-18
9	Study of landscaping in roads, parks, cities and towns	19-20
10	Vertical gardening-definition and importance and Roof gardening (Terrace gardening)- definition, importance and suitable plants.	21-23
11	Different Types of Flower arrangement: Western style-principles, Eastern style-types.	24-25
12	Rock garden, importance, suitable plants and management.	26-27
13	Shrubs-importance, classification and its management.	28-29
14	Climbers – twiners – ramblers – creepers, importance, classification and its management	30
15	Indoor plants-preparation of layout (Approach/public area, working/ service area, private/living area). Primary principles (Background, contrast, balance/proportion, open center, repetition, rhythm and variety).	31-32

PRACTICALS:

S.No.	Particulars	Exp. No.
1	Different types of gardens (Formal and informal) - description and management.	1
2	Establishment of Lawn and their management	2
3	Arches, Pergola and Water Gardens	3
4	Identification of Fence and Edge Plants.	4
5	Study of the design of garden structures and layout of rockery.	5
6	Different types of Flower arrangement (Eastern and western style)	6
7	Preparation of different types of bouquets	7
8	Identification of ornamentals for topiary and practice of topiary work	8
9	Identification of Annual flower plants and preparation of different types of flowerbeds	9-10
10	Identification of shrubs, herbs, vines, Cacti, Succulents, Palms and Ferns	11
11	Identification of different perennial trees for avenues and high ways	12
12	Preparation of layout for Indoor Gardening	13
13	Flower arrangement for exhibition purpose	14
14	Visit to nearby ornamental gardens	15
15	Visit to nearby recreational and children's park	.16

DH-206 – MEDICINAL AND AROMATIC CROPS CULTIVATION (2+1)

THEORY:

S.No.	Particulars	Lecture No.
1	Medicinal Crops-Introduction History, importance, scope in India.	1
2	Present status (export & import), future prospects and constraints in the cultivation of Medicinal crops.	2
3	**DIOSCOREA-**Importance and uses, origin and distribution botany species, varieties, soil, climate requirements of various species, propagation, Field preparation, spacing, planting, staking, manures & fertilizers, irrigation, interculture& inter cropping, duration of the crop, harvesting, yield & marketing.	3
4	**RAUVOLFIA-**Importance and uses, origin and distribution botany varieties, soil, climate propagation spacing, planting, manuring, irrigation, weeding, harvesting, root yield	4
5	**MEDICINAL SOLANUM-**Importance and uses, origin and distribution, description of plant, varieties, soil, climate, propagation manures, fertilizers and inter cultivation, Harvesting, crop duration, method of harvesting drying , gradingand yield, chemical constituents	5
6	**PYRETHRUM** Importance and uses, origin and distribution botany, types and varieties, soil, climate season, land preparation propagation, planting, and fertilizers, irrigation, harvesting,drying yield of flowers and pyrethrin content, extraction and storage.	6
7	**PERIWINKLE** Importance and uses, origin and distribution botany types and varieties, soil, climate propagation spacing, planting, manures & fertilizers, irrigation, weed control,interculture, mulching, harvesting & yield.	7
8	**OPIUM POPPY** Importance and uses, origin and distribution botany, varieties, soil, climate, propagation spacing, manures & fertilizers, irrigation, interculture and weeding flowering and fruit set, lancing and latex collection, processing, harvesting ofseeds, yield of crude opium and seed, chemical composition.	8-9
9	**ASWAGANDHA** Importance and uses, origin and distribution, description of plant, varieties, soil, climate, propagation manures, fertilizers and inter cultivation, Harvesting, crop duration, method of harvesting drying, grading and yield, chemical constituents.	10
10	**AMLA** Importance and uses, origin and distribution botany species, varieties, soil, climate requirements of various species, propagation, Field preparation, spacing, planting, staking, manures & fertilizers, irrigation, interculture& inter cropping, duration ofthe crop, harvesting, yield & marketing.	11

11	**ALOE** Importance and uses, origin and distribution, description of plant, species and varieties, soil, climate, land preparation, propagation crop duration, spacing & planting, manuring, irrigation, intercultivation, harvesting, yield and chemical composition.	12
12	**SENNA** Importance and uses, origin and distribution, botany varieties, soil, climate land preparation propagation, sowing, manures and fertilizers, crop rotation and intercropping, irrigation, weeding and interculture, harvesting, drying & storage,yield.	13
13	**ISABGOL** Importance and uses, origin distribution area, production, description of plant, varieties, soil, climate propagation, manures & fertilizers, irrigation, harvesting,yield, chemical composition	14-15
14	**COLEUS** Importance and uses, origin and distribution, botany, varieties, soil and climate,propagation, spacing, planting, manures and fertilizers, irrigation, weeding, Harvesting and yield of tubers.	16
15	**OCIMUM** Importance and uses, origin, distribution, botany, varieties, soil, climate, season, propagation, cultivation details, harvesting & yield.	17
16	Aromatic Crops-Introduction History, importance, scope in India	18
17	Present status (export & import), future prospects and constraints in the cultivation of Aromatic crops	19
18	**CITRONELLA** Importance and uses, origin, distribution, area and production, botany, varieties, soil, climate, land preparation, propagation, spacing, planting, manures andfertilizers, irrigation, interculture, harvesting & yield of herb and oil.	20
19	**LEMONGRASS** Importance and uses, origin, distribution, area and production, botany, varieties, soil, climate, land preparation, propagation, spacing, planting, manures andfertilizers, irrigation, interculture, harvesting & yield of herb and oil.	21
20	**PALMAROSA** Importance and uses, origin, distribution, botany, types and varieties, soil, climate, land preparation, propagation, spacing, planting, manures and fertilizers, irrigation,interculture, harvesting & yield.	22
21	**GERANIUM** Importance and uses, origin, distribution, botany, varieties, soil, climate, propagation, spacing, planting and after care, manures and fertilizers, harvesting& yield.	23
22	**KHUS GRASS** Importance and uses, origin, distribution, botany, types and varieties, soil, climate,land preparation, propagation, spacing, planting, manures and fertilizers, irrigation, interculture, harvesting & yield.	24

23	**DAVANA** Importance and uses, origin, distribution, botany, varieties, soil, climate, season,propagation, cultivation details, harvesting & yield.	25
24	**EUCALYPTUS** Importance and uses, origin, distribution, area and production, botany, varieties,soil, climate, land preparation, propagation, spacing, planting, manures and fertilizers, irrigation, interculture, harvesting & yield of herb and oil.	26
25	**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.	27
26	**VANILLA** Importance and uses, origin, distribution, botany, varieties, soil, climate, season, propagation, cultivation details, harvesting & yield.	28
27	**ROSE** Importance and uses, origin, distribution, area and production, botany, varieties,soil, climate, land preparation, propagation, spacing, planting, manures and fertilizers, irrigation, interculture, harvesting, yield, Extraction of essential oil.	29
28	**JASMINE** Importance and uses, origin, distribution, area and production, botany, varieties, soil, climate, land preparation, propagation, spacing, planting, manures andfertilizers, irrigation, interculture, harvesting, yield, Extraction of essential oil.	30
29	**EXTRACTION METHODS:** Extraction methods for essential oil crops – distillation methodology and advantages and disadvantages of water distillation, water & steam distillation, steam distillation. Distillation process, effleurage or cold fat extraction, Maceration or Hot fatextraction, Solvent extraction, Expression, Supercritical Fluid Extraction (SCFE), storage of essential oils.	31-32

PRACTICALS:

S.No	Particulars	Exp. No.
1	Collection of various medicinal plants in locality	1
2	Different medicinal plants identification and description	2
3	Preparation of Medicinal Plants herbarium	3
4	Collection of various aromatic plants in locality	4
5	Different aromatic plants identification and description	5
6	Preparation of Aromatic Plants herbarium	6
7	Drying, curing and primary processing for important medicinal plants	7
8	Drying, curing and primary processing for important aromatic plants	8
9	Extraction of essential oil from aromatic crops	9-10
10	Visit to research institutes working on medicinal and aromatic plants	11-12
11	Visit to commercial farms of medicinal plants.	13
12	Visit to commercial farms of aromatic plants.	14
13	Visit to Ayurvedic pharmacy	15
14	Visit to commercial perfumery industry	16

DH-207: PROTECTED CULTIVATION OF VEGETABLES AND FLOWERS (1+1) THEORY:

S.No.	Particulars	Lecture No.
1	Protected cultivation of horticultural crops- Definition, Importance	1
2	Green House-Definition, Advantages and disadvantages of greenhouse cultivation over Traditional cultivation of horticultural crops.	2
3	Types of Green House (Based on size, use, structure, roof material and cost)	3
4	Growing media-Types (Soil and soil-less media)	4
5	Media sterilization (Pasteurization, chemical fumigation and soil solarization)	5
6	Factors to be remembered before construction of Green house	6
7	Green House-Planning design, direction, construction, plan, roof construction,care to be taken before construction.	7-8
8	Light regulation in Greenhouse	9
9	Ventilation in greenhouse (Natural and forced)	10
10	Rose - Bed preparation, soil, climate, varieties, propagation, planting, irrigation, fertigation, special cultural operations (training, pruning, bending and disbudding), intercultural operations (weeding and loosening of beds),growth regulators, harvesting, yield, physiological disorders.	11-12
11	Gerbera - Bed preparation, soil, climate, varieties, propagation, planting, irrigation, fertigation, intercultural operations, harvesting, yield, physiological disorders.	13
12	Capsicum - Bed preparation, soil, climate, varieties, propagation, planting, irrigation, fertigation, special cultural operations (training and pruning), intercultural operations, harvesting, yield.	14
13	Tomato - Bed preparation, soil, climate, varieties, propagation, planting, irrigation, fertigation, special cultural operations (staking, training, pruning, cluster thinning, leaf pruning, lowering and pollination), intercultural operations, harvesting stages, yield, physiological disorders, post harvestoperations (grading, packing, waxing and storage)	15
14	Cucumber - Bed preparation, soil, climate, varieties, propagation, planting, irrigation, fertigation, special cultural operations (training and pruning), intercultural operations, harvesting and yield.	16

PRACTICALS:

S.No.	Particulars	Exp. No.
1	Study of different sections in polyhouse.	1
2	Preparation of Growing media and Sterilization	2
3	Study of different soilless media-Properties and uses	3
4	Preparation of different beds in polyhouse	4
5	Irrigation schedule of different crops in polyhouse	5
6	Fertigation schedule of different crops in polyhouse and precautions to befollowed	6-7
7	Training and pruning techniques of Rose and Gerbera	8
8	Training and pruning techniques of Tomato, Capsicum and Cucumber inpolyhouse.	9
9	Identification of pest and diseases and their management in polyhouse.	10
9	Identification of Physiological disorders and Nutritional deficiency symptoms and their management in polyhouse.	11
10	Post-Harvest practices of different crops in polyhouse	12-13
11	Visit to field to study different types of polyhouses.	14
12	Visit to commercial polyhouses for study of flowers	15
13	Visit to commercial polyhouses for study of vegetables	16

DH-223 – DRYLAND HORTICULTURE AND WATERSHED MANAGEMENT (2+1)

THEORY:

S.No.	Particulars	Lecture No.
1	Cultivation of Horticultural crops in dryland - Meaning, Dry farming, dryland agriculture and rainfed agriculture, history of dryland agriculture	1 & 2
2	Study of prominent institutes established and projects implemented for drylands:CRIDA, CSWCRTI, ICRISA, CAZRI, CIAH and AICRPDA	3 & 4
3	Classification of Climates and regions	5 & 6
4	Problems of Dryland farming	7 & 8
5	Drought: definitions, frequency of droughts, factors affecting drought, types ofdrought and their characteristics	9 & 10
6	Methods of mitigating drought, study of plants mitigating drought	11 & 12
7	Alternate land use system, ALU planning	13
8	Soil erosion: meaning, types- Water erosion-meaning, factors affecting water erosion, stages of water erosion, consequences of water erosion,	14
9	Wind erosion: meaning, stages of wind erosion-measures to overcome wind erosion	15
10	Soil and moisture conservation: meaning, agronomic measures, mechanical methods and forestry measures of soil conservation	16-18
11	Fruit plants and their varieties suitable for drylands	19
12	Management of orchards in Drylands	20-22
13	Evaporation; Meaning, measures to minimize evaporation losses	23-24
14	Transpiration: meaning, types, factors governing transpiration	25
15	Anti-transpirants: meaning, types with examples	26
16	Watershed: meaning, factors affecting watershed, principles of watershed	27-28
17	Alternate land use systems-agroforestry systems: meaning, aim, agroforestry systems for cultivable lands- alley cropping, agri-silviculture, agri horticulture	29-30
18	Agroforestry systems for non - cultivable lands (hortipastoral system, silvi pastoral, ley farming, tree farming and Timber cum fiber system)	31-32

PRACTICALS:

S.No.	Particulars	Exp. No.
1	Allotment of fields, seed treatment	1
2	Tillage practices for dry lands (Minimum tillage, zero tillage, Deep summerploughing)	2
3	Methods of application of fertilizers	3
4	Study of implements used in dryland	4
5	Study of Moisture conservation practices in dryland	5
6	Study the efficacy of soil conservation methods	6
7	Study on Mulching	7
8	Study of Anti-transpirants	8
9	Visit to watershed areas	9
10	Study of growth parameters in dryland	10-11
11	Study on the vagaries of rainfall on crop	11
12	Study on soil erosion problems in the field	12
13	Collection of data on temperatures and evaporation	13
14	Harvest and pot harvest yield attributes and yield data collection in horticultural crops of dryland	14-16

DH-271: HORTICULTURAL EXTENSION, TEACHING METHODS AND PROGRAM PLANNING (1+1)

THEORY:

S.No.	Particulars	Lecture No.
1	Education, Extension Education, Horticultural Extension Education - Definition	1
2	Horticultural extension- meaning goal, objective. Principles that contribute to the effective dissemination of horticultural extension programmes in villages.	2
3	Extension teaching methods - concept, classification	3
4	Extension programme plan	4
5	Goals, Objectives and Functions of DWACRA, TSMIP, NHM.	5
6	Objectives goals and Functions of SHM, KVK	6
7	Individual relationships-meaning, elements needed for management, uses and limitations.	7
8	Mass relations - meaning, elements required for management, uses andlimitations.	8
9	Group relations - meaning, elements required for management, uses andlimitations.	9
10	Teaching aids: Audio & Visual (Posters, Charts - Types, Panel Graph,Flash Cards) horticultural Communications aids (Brochure, Folder, Circular Letter, Info Letter and Bulletin)	10
11	Meaning of audio and visual aids, instructions for planning and making.	11
12	Hearing aids - meaning, radio and tape recorder - their use in horticultural activities.	12
13	Communication skills and English grammar. Active voice and passivevoice, direct and in-direct speech	13
14	Articles (a, an, the) - usage. Synonyms and antonyms	14
15	Letter writing and dictionary usage	15
16	Preparation of Bio-data and report	16

PRACTICALS:

S.No.	Particulars	Exp. No.
1	Making posters, charts, panel graphs and flash cards.	1
2	Preparation of folders, brochure, circular letter, newsletter and bulletinetc.	2
3	Conducting group meetings.	3
4	Conducting group discussions	4
5	Conducting method demonstrations.	5
6	Conducting result demonstrations.	6
7	Writing letters to various officers - exercise.	7
8	Articles using a, an, the	8
9	Active voice and passive voice - exercise.	9
10	Direct speech and in direct speech - exercise	10
11	Parts of speech - exercise	11
12	Writing letters and phone conversation	12
13	Bio data Making – exercise.	13
14	Report Making – exercise.	14
15	Exercise on how to prepare report for various activities.	15
16	Visit to farmers meetings.	16