

B. Sc. (Hons) Agriculture

Horticulture

- **Syllabus**
- **Teaching Schedule**
- **Suggested Readings**

B. Sc. (Hons) Agriculture

Departmentwise list of courses

Horticulture

Sr. No.	Semester	Course No.	Credits	Course Title
1	I	HORT 111	2(1+1)	Fundamentals of Horticulture
2	III	HORT 232	2(1+1)	Production Technology for Vegetables and Spices
3	IV	HORT 243	2(1+1)	Production Technology for Fruit and Plantation Crops
4	V	HORT 354	2(1+1)	Production Technology for Ornamental Crops, MAP and Landscaping
5	V	ELE HORT 355	3(2+1)	Protected cultivation of horticultural crops
6	VI	HORT 366	2(1+1)	Post-harvest Management and Value Addition of Fruits and Vegetables
7	VI	ELE HORT 367	3(2+1)	Landscaping
8	VI	ELE HORT 368	3(2+1)	Hi-tech Horticulture
9	VIII	ELM HORT 489	10(0+10)	Commercial Horticulture
10	VIII	ELM HORT 4810	10(0+10)	Floriculture and Landscape Gardening
11	VIII	ELM HORT 4811	10(0+10)	Nursery Management of Horticultural Crops
12	VIII	ELM HORT 4812	10(0+10)	Commercial Vegetable Production
13	VIII	ELM HORT 4813	10(0+10)	Protected Cultivation of Flowers and Vegetables
14	VIII	ELM HORT 4814	10(0+10)	Post-harvest Management and Value Additions of Horticultural Crops

Course :	HORT 111		Credit:	2(1+1)	Semester-I
Course title:	Fundamentals of Horticulture				

Syllabus

Theory

Horticulture-Its definition and branches, importance and scope; horticultural and botanical classification; climate and soil for horticultural crops; Plant propagation-methods and propagating structures; principles of orchard establishment; Principles and methods of training and pruning, juvenility and flower bud differentiation; unfruitfulness; pollination, pollinizers and pollinators; fertilization and parthenocarpy; kitchen gardening; garden types and parts; lawn making; medicinal and aromatic plants; species and condiments; use of plant bio-regulators in horticulture. Irrigation & fertilizers application-method and quantity.

Practical

Identification of garden tools. Identification of horticultural crops. Preparation of seed bed/nursery bed. Practice of sexual and asexual methods of propagation. Layout and planting of orchard plants. Training and pruning of fruit trees. Transplanting and care of vegetable seedlings. Making of herbaceous and shrubby borders. Preparation of potting mixture, potting and repotting. Fertilizer application in different crops. Visits to commercial nurseries/orchard.

Teaching Schedule

a) Theory

Lecture	Topics	Weightage (%)
1	Horticulture-Its definition and branches, importance and scope	10
2	Horticultural and botanical classification	05
3	Climate and soil for horticultural crops	10
4	Plant propagation-methods and propagating structures	10
5	Principles of orchard establishment	05
6	Principles and methods of training and pruning, juvenility and flower bud differentiation	10
7	Unfruitfulness	10
8	Pollination, pollinizers and pollinators	
9	Fertilization and parthenocarpy	
10	Kitchen gardening	10
11	Garden types and parts;	
12	Lawn making;	05
13	Medicinal and aromatic plants;	05
14	Spices and condiments;	05
15	Use of plant bio-regulators in horticulture	05
16	Irrigation & fertilizers application-method and quantity	10
	Total	100

b) Practical

Experiment	Topics
1	Identification of garden tools
2	Identification of horticultural crops
3	Identification of horticultural crops
4	Preparation of seed bed/nursery bed
5	Practice of sexual method of propagation
6	Practice of asexual methods of propagation – Cutting & Layering
7	Practice of asexual methods of propagation – Budding
8	Practice of asexual methods of propagation – Grafting
9	Layout and planting of orchard plants
10	Training and pruning of fruit trees
11	Transplanting and care of vegetable seedlings
12	Making of herbaceous and shrubby borders
13	Preparation of potting mixture, potting and repotting
14	Fertilizer application in different crops
15	Visits to commercial nurseries
16	Visits to commercial orchard

Suggested Readings:

Sr. No	Title of Book	Authors
1	Fruit Culture in India	Sham Singh and others
2	Handbook of Horticulture	ICAR Publication
3	Principles of Horticulture and fruit growing	Kunte and Yawalkar
4	Production Technology of Fruit Crops	Shanmugvelu, K.G.

Course :	HORT 232		Credit:	2(1+1)	Semester-III
Course title:	Production Technology for Vegetables and Spices				

Syllabus

Theory

Importance of vegetables & spices in human nutrition and national economy, brief about origin, area, production, improved varieties and cultivation practices such as time of sowing, sowing, transplanting techniques, planting distance, fertilizer requirements, irrigation, weed management, harvesting, storage, physiological disorders, disease and pest control and seed production of important vegetable and spices.

Practical

Identification of vegetables & spices crops and their seeds. Nursery raising. Direct seed sowing and transplanting. Study of morphological characters of different vegetables & spices. Fertilizer applications. Raising of nursery of vegetables & spices. Vegetables & spices seed extraction. Harvesting & preparation for market. Economics of vegetables and spices cultivation.

Teaching Schedule

a) Theory

Lecture	Topic	Weightage (%)
1	Importance of vegetables & spices in human nutrition and national economy	10
	Brief about origin, area, production, improved varieties and cultivation practices such as time of sowing, sowing, transplanting techniques, planting distance, fertilizer requirements, irrigation, weed management, harvesting, storage, physiological disorders, disease and pest control of following crops	
2	Solanaceous vegetables	10
3	Cucurbits	10
4	Legume vegetables	05
5	Okra	10
6	Onion and Garlic	10
7	Leafy vegetables	05
8	Perennial vegetables, under exploited and wild vegetables	20
9	Black pepper	
10	Nutmeg	
11	Cinnamon	
12	Clove & Cardamom	
13	Turmeric & Ginger	10
14	Minor spices – Kokum, Curry leaf, Tirphal	
15	Multistoried cropping	05
16	Seed production of important vegetables and spices	05
	Total	100

b) Practical

Experiment	Topic
1	Identification of vegetables crops and their seeds (Solanaceous, Cucurbits, Okra)
2	Identification of vegetables crops and their seeds (Leguminous, leafy, Other)
3	Identification of spices crops and their seeds (Tree Spices)
4	Identification of spices crops and their seeds (Seed Spices and condiments)
5	Nursery raising
6	Direct seed sowing and transplanting
7	Study of morphological characters of different vegetables
8	Study of morphological characters of different spices
9	Fertilizers applications
10	Propagation and raising of nursery of vegetables
11	Propagation and raising of nursery of spices
12	Vegetables & spices seed extraction
13	Harvesting & preparation for market of vegetables
14	Harvesting & preparation for market of spices
15	Economics of vegetables cultivation
16	Economics of spices cultivation

Suggested Readings:

Book	Title of Book	Authors
1	Vegetables	B. Choudhary
2	Vegetable Crops	T. K. Bose, M. G. Som and T. Kabir
3	Vegetable, Tuber and Spices	S.Thamburaj
4	Production technology of vegetable crops	S. P. Singh
5	Vegetables – Production Technology Astral International	Haldavnekar, P.C.; Parulekar, Y.R.; Mali, P.C. and Haldankar, P.M.
6	Major Spices of India	J.S.Pruthi
7	Minor Spices and Condiments	J.S.Pruthi
8	Introduction to spices and plantation crops	N.Kumar and others
9	Spice Crops Vol.I and Vol. II	Parthasarathi and Others

Course :	HORT 243		Credit:	2(1+1)	Semester-IV
Course title:	Production Technology for Fruit and Plantation Crops				

Syllabus

Theory

Importance and scope of fruit and plantation crop industry in India; High density planting; Use of rootstocks; Production technologies for the cultivation of major fruits- mango, banana, citrus, grape, guava, litchi, papaya, apple, pear, peach and; minor fruits- pineapple, pomegranate, jackfruit, strawberry, nut crops; plantation crops-coconut, arecanut, cashew, tea, coffee & rubber.

Practical

Seed propagation. Scarification and stratification of seeds. Propagation methods for fruit and plantation crops including Micro-propagation. Description and identification of fruit. Preparation of plant bio regulators and their uses, Pests, diseases and physiological disorders of above fruit and plantation crops, Visit to commercial orchard.

Teaching Schedule

a) Theory

Lecture	Topic	Weightage (%)
1	Importance and scope of fruit and plantation crop industry in India	05
2	High density planting; Use of rootstocks	05
3	Special Horticulture practices	05
	Production technologies for the cultivation of major fruits	
4	Mango	10
5	Banana	10
6	Citrus	20
7	Grape	
8	Guava	
9	Litchi	
10	Papaya	05
11	Apple, Pear and Peach	05
12	Minor fruits- pineapple & Pomegranate	05
13	Minor fruits- Jackfruit & Strawberry	05
14	Nut crops; plantation crops-Coconut & Arecanut	10
15	Cashew	10
16	Tea, coffee & rubber	05
	Total	100

b) Practical

Experiment	Topics
1	Seed propagation
2	Scarification and stratification of seeds
3	Propagation methods for fruit crops including Micro-propagation
4	Propagation methods for plantation crops including Micro-propagation
5	Description and identification of fruit
6	Description and identification of Plantation crops
7	Preparation of plant bio regulators and their uses
8	Establishment of commercial nursery, Nursery Act
9	Establishment of model orchard and its economics
10	Intercropping and multistoried cropping
11	Rejuvenation of old senile orchards
12	Pests of above fruit and plantation crops
13	Diseases of above fruit and plantation crops
14	Physiological disorders of above fruit and plantation crops
15	Visit to commercial orchard of fruits
16	Visit to commercial orchard of plantation crop

Suggested Readings:

Book No.	Title of Book	Authors
1	Handbook of Horticulture	ICAR publication
2	Tropical and Subtropical Fruit crops	T.K.Bose and others
3	Fruit Culture in India	Sham Singh and others
4	Fruits	Ranjit Singh
5	Physiology of Fruit Production	Amar Singh
6	Coconut	Thumpan
7	Advances in Horticulture	Ed by K.L.Chadha
8	Temperate fruits	Mitra, Thakur and Bose
9	Introduction to spices and Plantation crops	N.Kumar
10	Plantation Crops	J.S.Pruthi

Course :	HORT 354		Credit:	2(1+1)	Semester-V
Course title:	Production Technology for Ornamental Crops, MAP and Landscaping				

Syllabus

Theory

Importance and scope of ornamental crops, medicinal and aromatic plants and landscaping. Principles of landscaping. Landscape uses of trees, shrubs and climbers. Production technology of important cut flowers like rose, gerbera, carnation, liliun and orchids under protected conditions and gladiolus, tuberose, chrysanthemum under open conditions. Package of practices for loose flowers like marigold and jasmine under open conditions. Production technology of important medicinal plants like asparagus, aloe, costus, Cinnamomum, periwinkle, isabgol and aromatic plants like mint, lemongrass, citronella, palmarosa, ocimum, rose, geranium, vetiver. Processing and value addition in ornamental crops and MAPs produce.

Practical

Identification of Ornamental plants. Identification of Medicinal and Aromatic Plants. Nursery bed preparation and seed sowing. Training and pruning of Ornamental plants. Planning and layout of garden. Bed preparation and planting of MAP. Protected structures – care and maintenance. Intercultural operations in flowers and MAP. Harvesting and post-harvest handling of cut and loose flowers. Processing of MAP. Visit to commercial flower/MAP unit.

Teaching Schedules:

a) Theory

Lecture	Topic	Weightage (%)
1	Importance and scope of ornamental crops and landscaping	10
2	Importance and scope of medicinal and aromatic plants	
3	Principles of landscaping	10
4	Landscape uses of trees, shrubs and climbers	
5	Production technology of important cut flowers like rose under protected conditions	10
6	Production technology of important cut flowers like gerbera, carnation under protected conditions	10
7	Production technology of important cut flowers like liliun and orchids under protected conditions	05
8	Production technology of important cut flowers like gladiolus, tuberose under open conditions.	10
9	Production technology of important cut flowers like chrysanthemum under open conditions.	10
10	Package of practices for loose flowers like marigold and jasmine under open conditions.	10
11	Production technology of important medicinal plants like asparagus, aloe, costus.	05

Lecture	Topic	Weightage (%)
12	Production technology of important medicinal plants like Cinnamon, periwinkle, isabgol	
13	Production technology of important aromatic plants like mint, lemongrass, citronella, palmarosa.	10
14	Production technology of important aromatic plants like ocimum, rose, geranium, vetiver.	
15	Processing and value addition in ornamental crops	05
16	Processing and value addition in MAPs produce	05
	Total	100

b) Practical

Practical No.	Topic
1	Identification of Ornamental plants and flower crops
2	Identification of Medicinal and Aromatic Plants
3	Propagation of Ornamental plant
4	Propagation of medicinal and aromatic plants
5	Nursery bed preparation and seed sowing
6	Training and pruning of Ornamental plants
7	Planning and layout of garden
8	Bed preparation and planting of MAP
9	Protected structures – care and maintenance
10	Intercultural operations in flowers
11	Intercultural operations in MAP
12	Harvesting and post harvest handling of cut flowers
13	Harvesting and post harvest handling of loose flowers
14	Processing of MAP
15	Visit to commercial flower
16	Visit to MAP unit

Suggested Readings:

Book	Title of Book	Authors
1	Floriculture and Landscaping	T.K.bose
2	Floriculture in India	Randhawa and Mukhopadhyay
3	Fundamentals of Floriculture	Laury
4	Complete Home Gardening	Dey, S.C.
5	Landscape Gardening & Design with Plants –	Supriya Kumar Bhattacharjee
6	Landscaping principles and practices –	Jack E. Ingels

Course :	ELE HORT 355		Credit:	3(2+1)	Semester-V
Course title:	Protected cultivation of horticultural crops				

Syllabus

Theory

Protected cultivation- importance and scope, Status of protected cultivation in India and World types of protected structure based on site and climate. Cladding material involved in greenhouse/ poly house. Greenhouse design, environment control, artificial lights, Automation. Soil preparation and management, Substrate management. Types of benches and containers. Irrigation and fertigation management. Propagation and production of quality planting material of horticultural crops. Greenhouse cultivation of important horticultural crops – rose, carnation, chrysanthemum, gerbera, orchid, anthurium, liliun, tulip, tomato, bell pepper, cucumber, strawberry, pot plants, etc. Cultivation of economically important medicinal and aromatic plants. Off-season production of flowers and vegetables. Insect pest and disease management.

Practical

Raising of seedlings and saplings under protected conditions, use of protrays in quality planting material production, Bed preparation and planting of crop for production, Inter cultural operations, Soil EC and pH measurement, Regulation of irrigation and fertilizers through drip, fogging and misting.

Teaching Schedule:

a) Theory

Lecture	Topic	Weightage (%)
1-4	Protected cultivation- importance and scope in India	10
	Current status of protected cultivation in India and World	
5-6	Types of protected structure based on site and climate, cladding material involved in greenhouse/ poly house	10
7-8	Greenhouse design, environment control, artificial lights, automation	5
9-11	Soil preparation and management, substrate management, types of benches and containers	10
12-13	Irrigation and fertigation management	10
14-15	Propagation and production of quality planting material of horticultural crops	5
16-24	Greenhouse cultivation of important horticultural crops – rose, carnation, chrysanthemum, gerbera, orchid, anthurium, liliun, tulip, etc	15
25-29	Greenhouse cultivation of important horticultural crops like tomato, bell pepper, cucumber, strawberry, pot plants. Cultivation of economically important medicinal and aromatic plants	20
30	Off-season production of flowers and vegetables	5
31-32	Insect pest and disease management	10

b) Practical

Experiment	Topic
1	Raising of seedlings and saplings under protected conditions Use of protrays in quality planting material production
2	Bed preparation and planting of crop for production
	Inter cultural operations of flower and vegetable crops
3	Green bending, disbudding, deshooting in roses
4	Supporting, pinching and disbudding in carnation
5	Deleafing, disbudding, in gerbera
6-7	Training, pruning of tomato, bell pepper, cucumber, etc.
8	Soil and water EC and pH measurement as per crop need
9	Regulation of irrigation and fertilizers through drip, fogging and misting
10-11	Harvesting, Precooling, grading, packing, storage of – rose, carnation, chrysanthemum, gerbera, orchid, anthurium, liliun, tulip, etc.
12-13	Harvesting, Precooling, grading, packing, storage of tomato, bell pepper, cucumber, strawberry, pot plants, etc.
14-15	Pest and disease management of flower and vegetable crops
16	Visit to commercial units and market

Suggested Readings:

- 1) S.D. Warade. 2003. Protected cultivation of Horticulture crops, CAFT(fruits), MPKV, Rahuri
- 2) Balraj Singh. 2005. Protected cultivation of vegetable crops, Kalyani publishers, New Delhi
- 3) Commercial Floriculture – Prasad & Kumar.
- 4) Proceedings of International seminar on protected cultivation in India, held at Bangalore (1997)
- 5) Greenhouse operation and management- Paul. V. Nelson
- 6) Patil, M.T and Patil, P.V. 2004. Commercial Protected Floriculture, MPKV, Rahuri

Course :	HORT 366		Credit:	2(1+1)	Semester-VI
Course title:	Post-harvest Management and Value Addition of Fruits and Vegetables				

Syllabus

Theory

Importance of fruits and vegetables, extent and possible causes of post harvest losses; Pre-harvest factors affecting postharvest quality, maturity, ripening and changes occurring during ripening; Respiration and factors affecting respiration rate; Role of ethylene; Post harvest disease and disorders; Heat, chilling and freezing injury; Harvesting and field handling; Storage (ZECC, cold storage, CA, MA, and hypobaric); Value addition concept; Principles and methods of preservation; Intermediate moisture food- Jam, jelly, marmalade, preserve, candy – Concepts and Standards; Fermented and non-fermented beverages. Tomato products- Concepts and Standards; Drying/ Dehydration of fruits and vegetables – Concept and methods, osmotic drying. Canning -- Concepts and Standards, packaging of products.

Practical

Applications of different types of packaging containers for shelf life extension. Effect of temperature on shelf life and quality of produce. Demonstration of chilling and freezing injury in vegetables and fruits. Extraction and preservation of pulps and juices. Preparation of jam, jelly, RTS, nectar, squash, osmotically dried products, fruit bar and candy and tomato products, canned products. Quality evaluation of products -- physico-chemical and sensory. Visit to processing unit/ industry.

Teaching Schedule:

a) Theory

Lecture	Topic	Weightage (%)
1	Importance of fruits and vegetables, extent and possible causes of post-harvest losses	10
2	Pre-harvest factors affecting postharvest quality and Maturity	
3	Ripening and changes occurring during ripening	10
4	Respiration and factors affecting respiration rate, Role of ethylene	
5	Post-harvest diseases & disorders	
6	Heat, chilling & freezing injury	
7	Harvesting and field handling	10
8	Storage (ZECC, Cold storage, CA, MA, and Hypobaric)	10
9	Value addition concept	05
10	Principles and methods of preservation	10
11	Intermediate moisture food- Jam, jelly, marmalade, preserve, candy – Concepts and Standards	10
12	Fermented and non-fermented beverages	05
13	Tomato products- Concepts and Standards	10
14	Drying/ Dehydration of fruits and vegetables – Concept and methods, osmotic drying	05
15	Canning -- Concepts and Standards	10
16	Packaging of products	05
	Total	100

b) Practical Schedule

Experiment	Topic
1	Applications of different types of packaging containers for shelf life extension.
2	Effect of temperature on shelf life and quality of produce.
3	Demonstration of chilling and freezing injury in vegetables and fruits.
4	Extraction and preservation of pulps and juices.
5	Preparation of Jam
6	Preparation of Jelly
7	Preparation of RTS and nectar
8	Preparation of squash and syrup
9	Preparation of osmotically dried products
10	Preparation of fruit bar and candy
11	Preparation of tomato products
12	Preparation of canned products.
13	Layout and planning of pack house
14	Layout and planning of processing unit
15	Quality evaluation of products -- physico-chemical and sensory.
16	Visit to processing unit/ industry.

Suggested Readings:

Book	Title of Book	Authors
1	Fruits and vegetables Preservation	Girdharilal, Sidappa and Tondan
2	Post Harvest Physiology, Handling, Utilization of tropical and subtropical fruits and vegetables	E.R.B. Pantastico
3	Preservation of fruits and vegetables – Principals and Practices	Shrivastava and Sangeev Kumar
4	Commercial fruits and Vegetable Products	W.V.Cruess
5	Post Harvest handling of fruits and Vegetables	Bal and Sandhu

Course :	ELE HORT 367		Credit:	3(2+1)	Semester-VI
Course title:	Landscaping				

Syllabus

Theory

Importance and scope of landscaping, principles of landscaping, garden styles and types, terrace gardening, vertical gardening, garden components, adornments, lawn making, rockery, water garden, walk-paths, bridges, other constructed features etc. gardens for special purposes. Trees: selection, propagation, planting schemes, canopy management, shrubs and herbaceous perennials: selection, propagation, planting schemes, architecture. Climber and creepers: importance, selection, propagation, planting, Annuals: selection, propagation, planting scheme, Other garden plants: palms, ferns, grasses and cacti succulents. Pot plants: selection, arrangement, management. Bio-aesthetic planning: definition, need, planning; landscaping of urban and rural areas, Peri-urban landscaping, Landscaping of schools, public places like bus station, railway station, townships, river banks, hospitals, play grounds, airports, industries, institutions. Bonsai: principles and management, lawn: establishment and maintenance, CAD application.

Practical:

Identification of trees, shrubs, annuals, pot plants; Propagation of trees, shrubs and annuals, care and maintenance of plants, potting and repotting, identification of tools and implements used in landscape design, training and pruning of plants for special effects, lawn establishment and maintenance, layout of formal gardens, informal gardens, special type of gardens (sunken garden, terrace garden, rock garden) and designing of conservatory and lathe house. Use of computer software, visit to important gardens/ parks/ institutes

Teaching Schedule

a) Theory

Lecture	Topic	Weightage (%)
1	Importance and scope of landscaping	5
2 - 4	Principles of landscaping	5
4 - 6	Garden styles and types, terrace gardening, vertical gardening,	10
7 - 9	Garden components, adornments, lawn making, rockery, water garden, walk-paths, bridges, other constructed features etc.	10
10–12	Gardens for special purposes.	05
13–16	Trees: selection, propagation, planting schemes, canopy management, shrubs and herbaceous perennials: selection, propagation, planting schemes, architecture.	10
17–19	Climber and creepers: importance, selection, propagation, planting,	05
20–21	Annuals: selection, propagation, planting scheme,	05
22–23	Other garden plants: palms, ferns, grasses and cacti succulents.	05
24–25	Pot plants: selection, arrangement, management.	05

Lecture	Topic	Weightage (%)
26	Bio-aesthetic planning: definition, need, planning;	05
27–29	Landscaping of urban and rural areas, Peri-urban landscaping, Landscaping of schools, public places like bus station, railway station, townships, river banks, hospitals, play grounds, airports, industries, institutions.	15
30	Bonsai: principles and management,	05
31	Lawn: establishment and maintenance.	05
32	CAD application.	05
	Total	100

b) Practical

Experiment	Topic
1.	Identifications and propagation of annual, herbs and shrubs
2.	Identifications and propagation of climbers, creepers and perennials
3.	Identifications and propagation palms, ferns, grasses, cacti and succulents
4.	Planning, designing and layout of formals and informal gardens
5.	Planning, designing and layout special gardens.
6.	Study of different potting mixtures, soilless cultures and preparation of potted plants
7.	Maintenance and repairs of potted plants
8.	Planting and Maintenance of Lawn
9.	Irrigation and nutrient management in Landscape garden
10.	Practicing terrarium gardens and vertical garden
11.	Development and Maintenance of topiary
12.	Practicing flower Arrangement
13.	Bonsai Practicing and training
14.	Canopy Management in ornamentals shrubs and perennials
15 & 16	Visit to Landscape gardens.

Suggested Readings:

- 1) Complete Gardening in India – Gopalswamiengar
- 2) Complete Home Gardening – Dey, S.C.
- 3) Floriculture and Landscaping – Bose, T.K.
- 4) Floriculture and Landscaping – Deshraj
- 5) Floriculture in India – Randhawa and Mukhopadhyay
- 6) Introduction to Landscaping, Designing, Construction and Maintenance – Ronald J.Biondo and Charles B. Schroder
- 7) Landscape Gardening & Design with Plants – Supriya Kumar Bhattacharjee
- 8) Landscaping principles and practices – Jack E. Ingels

Course :	ELE HORT 368		Credit:	3(2+1)	Semester-VI
Course title:	Hi-tech Horticulture				

Syllabus

Theory

Introduction & importance; Nursery management and mechanization; micro propagation of horticultural crops; Modern field preparation and planting methods, Protected cultivation: advantages, controlled conditions, method and techniques, Micro irrigation systems and its components; EC, pH based fertilizer scheduling, canopy management, high density orcharding, Components of precision farming: Remote sensing, Geographical Information System (GIS), Differential Geo-positioning System (DGPS), Variable Rate applicator (VRA), application of precision farming in horticultural crops (fruits, vegetables and ornamental crops); mechanized harvesting of produce.

Practical

Types of polyhouses and shade net houses, Intercultural operations, tools and equipments identification and application, Micro propagation, Nursery-protrays, micro-irrigation, EC, pH based fertilizer scheduling, canopy management, visit to hi-tech orchard/nursery

Teaching Schedule

a) Theory

Lecture	Topic	Weightage (%)
1	Introduction, importance and scope of Hi- tech horticulture in India	10
2	Hi- tech nursery management and mechanization of horticultural crop	10
3	Micro- propagation of horticultural crops	
4	Hi- tech field preparation and planting methods	5
5	Protected cultivation: advantages and constraints	5
6-7	Environmental control in green house -- temperature, light, CO ₂ , relative humidity and ventilation methods and techniques.	10
8	Micro irrigation systems and its components	5
9	EC and pH based irrigation / fertigation scheduling	5
10-11	Hi-tech canopy management of horticultural crop	5
12-16	High density orcharding in mango, guava, papaya, citrus, pineapple etc.	10
17	Remote sensing and Geographical Information System (GIS)	5
18	Differential Geo-positioning System (DGPS)	
19-30	Components of precision farming and application of precision farming in horticultural crops (fruits, vegetables and ornamental crops 2 crops each)	20

31	Mechanized harvesting of produce	5
32	Post harvest management for export	5
	Total	100

b) Practical

Experiment	Topic
1	Tools and equipments, identification and application
2	Study of different types of polyhouses and shade net houses
3-4	Intercultural operations in high density orchards
5-6	Intercultural operations in vegetables and flowers
7-8	Plant architecture
9-10	Micropropagation of horticultural crops
11-12	Hi-tech nursery production technique in protrays
13	Hi-tech Irrigation systems
14	Soil and water EC, pH measurement and fertigation
15	Precision farming techniques used in horticultural crops
16	Visit to hi-tech orchard/nursery

Suggested Readings:

1. T. A. More, Karale A. R. and Patil M.T. 2001. Hi-tech Horticulture, CAFT (Fruits), MPKV, Rahuri.
2. Balraj Singh.2005. Protected cultivation of vegetable crops, Kalyani Publishers, New Delhi.
3. Patil, M.T and Patil, P.V. 2004. Commercial Protected Floriculture, MPKV, Rahuri
4. Commercial Floriculture – Prasad & Kumar.
5. Proceedings of International seminar on protected cultivation in India, held at Bangalore (1997)
6. Greenhouse operation and management- Paul. V. Nelson