Syllabus of B.Sc.(Hort)

SEMESTER-V

Sr.No	Course No	Course title	Credits
1	H/VS-353	Breeding of Vegetable crops	2+1=3
2	H/FS-354	Temperate Fruits and Plantation crops.	2+1=3
3	H/HORT-354	Introductory Agro-forestry and Horti-silvipasture	1+1=2
4	H/FL-354	Protected Cultivation of Flower Crops	1+1=2
5.	H/BOT-354	Environmental Science and Agro-ecology	1+1=2
6.	H/ENTO-352	Insect Pest Management of Fruit, Plantation, Medicinal and Aromatic crops.	2+1=3
7.	H/ENTO-353	Insect Pest Management of Vegetable ornamental and Spices crops	2+1=3
8.	H/PATH-354	Mushroom Culture	0+1=1
9.	H/ENGG-351	Farm Power and Machinery	1+1=2
		Total	**12+9=21**

Course No. : H/VS-353 **Credits : 3(2+1)**
Course title : Breeding of Vegetable Crops **Semester : V**

Theory :

Importance and scope vegetable breeding. History, Centres of origin, plant bio-diversity and its conservation. Methods of reproduction, agencies of pollination and mechanism in self and cross pollinated crops. Self-incompatibility and male sterility, its classification and application. in crop improvement objective of breeding of vegetable crops, exploitation of hybrid vigour, polyploidy breeding resistance breeding, mutation breeding. Breeding methods for crop improvement in Crops viz., Solanaceous vegetables, cole crops, cucurbits, bulb crops, root crops, leafy vegetables, okra, leguminous crops, tropical tuber crops.

Practical :

Breeding kits, methods of emasculation, Floral biology and pollination mechanism in self and cross pollinated vegetables. Working out phenotypic and genotypic heritability, genetic advance. Preparation and uses of chemical and physical mutagens. Polyploidy breeding and chromosomal studies Techniques of hybridization. Maintenance of breeding records.

Books recommended :

1 Allard, R. W. (1960) Principles of plant breeding. Hohan Wiley and Sons, New York
2 Choudhari, R. C. (1984) Introduction to plant breeding Oxford and IBH Publishing Co., New Delhi.
3 Singh, B. D. (1987) Plant breeding Oxford and IBH Publishing Co., New Delhi.
4 Poehlaman, J. M. and D. Borthaku (1990) Breeding Asian Field Crops. Oxford and IBH Publishing Co., New Delhi.
5 Choudhary; H. K. (1979) Elementary Principles of plant breeding. Oxford and IBH Publishing Co., New Delhi
6 G. Kalloo, Vegetable breeding International books and periodicals supply services, Pitampura Delhi 110034.
7 Peter, K.V. - Tuber crops, National Book Trust, New Delhi.
8 Hari Har Ram (2006) : Vegetable breeding principles and practices, Kalyani publisher, New Delhi.
9 Peter, K.V. (2005) : Genetics and breeding of vegetables ICAR, New Delhi.
10 Kumar N, (2006) : Breeding of horticultural crops : Princples and practices, New India publishing New Delhi.

Course No. : H/VS-353 Credits : 3(2+1)
Course title : Breeding of Vegetable Crops Semester : V
Lesson plan - Theory

Lecture No.	Topic	Weightage
1	Importance, scope and objectives of breeding	5
2	History and Centers of origin	5
3	Plant bio-diversity and its conservation	10
4-5	Mode of reproduction mode of pollination	15
6-7	Self-incompatibility and male sterility, its classification and application in crop improvement	25
8	Method of breeding, Pure line selection	
9	Mass selection	
	Heterosis breeding	
10-11	Hybridization	
12	Pedigree method	
13	Mass pedigree method	
14	Bulk method	
15	Modified bulk method	
16	Single seed descent method and back cross method	
17	Pol loid breeding	
18	Mutation breeding	
19	Principles of breeding cross pollinated crops	25
20	Mass selection	
21	Recurrent selection	
22	Hetero_sis breeding	
23	Synthetics and composites	
24	Application of biotechnology in crop improvement	5
24	Crops	
25	Solanaceous vegetables (Tomato, Bringal, Chilli)	10
26	Cole crops (Cauliflower, Broccoli, Cabbage)	
27	Cucurbits (Cucumber, Bitter gourd, Bottle gourd, Ridge gourd, S on e ourd, Watermelon, Muskmelon)	
28	Bulb crops Onion, Garlic	
29	Root crops Radish, Carrot)	
30	Lea vegetables Palak, Methi, Coriander, Amaranthus	
31	Okra and Leguminous crops Peas, French bean, Dolichos bean	
32	Recommendations of JOINT AGRESCO for last five years	

Practical :

PracticalNo.	Topics
1	Breeding kits and method of emasculation ,
2	Floral biology and pollination mechanism in self and cross pollinatedVegetables
3-4	Floral biology and pollination mechanism in self and cross pollinated fruber crops
5-6	Floral biology and pollination mechanism in self and cross pollinated Species
7-8	Calculation on phenotypic and genotypic heritability, genetic advance
9-10	Preparation and uses of chemical and physical mutagens
11-12	Polyploidy breeding and chromosomal studies
13-14	Techniques of hybridization
15-16	Maintenance of breeding records, mutations and polyploidy

Course No. : H/FS-354 **Credits : 3(2+1)**
Course title : Temperate Fruits and Plantation crops **Semester : V**

Theory :

Importance and scope of temperate fruits and plantation crops. Classification of temperate fruits and plantation crops. Area and production of temperate fruit in India and Maharashtra. Export and import potential of temperate fruits and plantation crops. Role of temperate fruit crops and plantation crops in national economy, Uses and industrial importance. Propagation techniques in Apple, Pear, Peach, Apricot, Cherry, Persimmon, Strawberry, Kiwi, Almond, Walnut, Pecan nut, Coconut, Areca nut, oil palm, Cacao, Cashew nut, Coffee, Tea, and Rubber. Training , Pruning, Use of plant growth regulators, Nutrient and weed management, harvesting of above crops. Important insect pest and diseases and their control measures on above crops.

Practical :

Identification, discription of varieties of Apple, Pear, Peach, Apricot, Cherry, Plum, Persimmon, Strawberry, Kiwi, Almond, Walnut, Pecan nut, Coconut, Areca nut, oil palm, Cacao, Cashew nut, Coffee, Tea, Rubber and Betelvine. Manuring and fertilization of above crops. Planting system adoted for above crops. Training and pruning in temperate fruit crop and plantation crops and it's role. Harvesting grading, trimming, washing, drying and packaging of tea and coffee. Preparation of cutting and rooting of tea under specialized structure. Working out the economics for Pear, Apple, Plum and Peach. Planting of seednuts of Arecanut, Coconut in nursery.

Books recommended:

1. A text book on Pomology (Temperate Fruits) Vol. IV - T. K. Chattopadhyay, Kalyani Publisher.
2. Temperate Fruits - Mitra, Thakor and Bose.
3. Plantation Crop - Pruthi
4. Hand book of Horticulture - K. L. Chadha
5. A text book on plantation crops - K. M. Pillai.
6. Introduction to spices and plantation crops- N. Kumar
7. Advances in Horticulture - K. L. Chadha

Course No. : H/FS-354 **Credits : 3(2+1)**
Course title : Temperate Fruits and Plantation crops **Semester : V**

Lesson plan `A' - Theory (Temperate Fruits)

Lecture No.	Topic	Weightage
1	Importance and scope, Classification temperate fruits	10
	Detailed study of areas, production, varieties, climate and soil requirements, propagation, planting density, cropping systems, aftercare training and pruning, self incompatibility and pollonizers, use of growth regulators, nutrient and weed management, harvesting, physiological disorders post harvest handling and storage of following crops	
2	Apple	8
3-5	Pear, Almond and Walnut	8
6-7	Peach and Plum	2
8	A ricot and cherry	2
9	Persimmon and Strawberry	2
10	Kiwi and Queens land nut Mecademia nut	2
11	Pecan nut, hazel nut and chest nut	2
12	Re- plant problem	5
13	Rejuvenation and special production problems like pre-mature leaf fall	5
14	Physiological disorders	5
15-16	Important insect - pests and diseases and their control measures	5

Lesson plan `B' - Theory (Plantation Crops)

Lecture No.	Topic	Weightage
17	History and development, scope and importance and classification Area and production, export and import potential Role in national and state economy	7
18, 19	Uses, industrial im ortance, b products utilization	
	Soil and climate, varieties, propagation: principles and practices of seed, vegetative and micro-propagation, planting systems and method, gap filling, systems of cultivation, mulching, shade regulation, weed and water management, training, pruning and handling, nutrition, foliar feeding, role of growth regulators, soil management, liming practices, tipping practices, top working, physiological disorders, harvesting, post-harvest handling and processing, packaging and marketing, yield, special problem and constraints in each crops	
20,21	Coconut	10
22,23	Areca nut	2
24,25	Cashew nut	10
26	Oil palm	2
27	Palm ra palm	2
28	Cocoa	2
29,30	Coffee, Tea, Rubber	4
31	Betelvine	5
32	Recommendations of JOINT AGRESCO for last five years	

Practical

Practical No.	Topics
1	Propagation of temperate fruits. Apple, Pear, Plum and Peach
2	Propagation of Nuts, Almond, Walnut, Pecan nut
3	Planting of important temperate fruits planting systems and season of planting
4	Planting of important nut crops, planting systems and season of planting
5	Description of varieties of Apple, Pear, Plum and Peach
6	Description of varieties of Apricot, Almond, Walnut and cherry
7	Training, pruning in temperate fruit crops
8	Manuring and fertilizer application to temperate fruit crops
9	Preparation and use of growth regulators in temperate fruit crops and working of economics of important temperate fruit crops viz. Apple, Pear, Plum and Peach
10	Propagation of Coconut and Areca nut. Selection of mother palms and seednuts and layout of nurse of Coconut and Areca nut.
11	Description of varieties of Coconut and Areca nut.
12	Layout and planting of Coconut and Areca nut, Oil palm and Cashew nut, Cocoa gardens.
13	Description of varieties and species of Coffee and sowing of Coffee
14	Harvesting and processing of Coffee.
15	Propagation in Cashew nut, rejuvenation of Cashew nut and tea
16	Working out the Economics and project preparation for Coconut/Arecanut/Oil palm/Cashew nut/Cocoa

Course No. : H/HORT-354 **Credits : 2(1+1)**
Course title : Introductory Agroforestry and Horti – silvipasture **Semester : V**

Theory :

Definition, objectives and importance, integration, advantages and constraints. Distinction between agroforestry and social forestry. Status of Indian forests and role in India of agroforestry. Classification of agroforestry system, subsystem and practice : agri silviculture, silvipastoral, horti-silviculture, horti-silvipastoral, shifting cultivation, taungya, home gardens, alley cropping, intercropping, wind breaks, shelterbelts and energy plantations. Planning for agroforestry - constraints, diagnosis and design methodology, selection of tree crop species for agro-forestry. MPTS - their management practices, economics of cultivation - nursery and planting (Acacia *catechu, Dalbergia sissoo" Tectona, Populus, Moros, Grewia, Eucalyptus, Quercus spp.* and bamboo, tamarind, neem etc.)

Practical :

Identification of seeds and seedlings of multipurpose tree species. Nursery practices for poplar, *Grewia optiva, Moros alba, Acacia catechu, Dalbergia sissoo,* leucaena etc. Visit to agIo-forestry fields to study the compatibility of MPTS with agricultural crops: silvipastoral, alley cropping, horti-silviculture, agro-silvipasture, fuel and fodder blocks. Visit to social forestry plantations - railway line plantations, canal plantations, roadside plantations, industrial plantations and shelterbelts. Economics and marketing of products raised in agro-forestry systems.

Books Recommended :

1. Negi, S.S. Silverculture - Principles and methods - IBD, Dehradun
2. Khosla, Puri and Khorana- Agrforestry systems - IBD, Dehradun
3. Dwivedi, A.P. - A text book of silviculture - IBD, Dehradun
4. Twean, K.M.-social forestry in India - Natraj Publishers, - IBD, Dehradun

Course No. : H/HORT-354 **Credits : 2(1+1)**
Course title : Introductory Agroforestry and Horti – silvipasture **Semester : V**

Lesson Plan - Theory

Periods	Lesson	Weightage
1	A oforest -Definition	4
	Objectives	4
	Importance	4
1	Integration - Agriculture and forest	4
1	Benefits/advantages and constraints of A oforest	10
1	Status of Indian forests and role of A oforest in India	6
2	Practices : Agrisilviculture, Silvipastoral hortisilviculture, hortisilvi astoral Shifting cultivation	10
2	Taun a, home gardens, alley cropping, intercro in	10
2	Windbreaks, shelterbelts and energy plantations	10
1	Planning for a rofores - diagnosis and design methodology	8
1	Selection of tree crop species - characteristics of species	10
2	MPTS - Their management practices - Tending operations	10
2	Economics of cultivation - nurse and planting practices.	10
1	Identification of seeds and seedlings of MPTS	
2	Nursery practices for populus, silverook, mulberry, khair, sisoo, and leuceana	
2	Visit to field of MPTS with agricultural crops	
2	Visit to social forestry plantations - railway line, and canal plantations.	
1	Roadside plantations, industrial plantations and shelter belts	
1	Economics and marketing of products raised in agroforestry systems	

Course No. : H/FL-354 **Credits : 2(1+1)**
Course Title : Protected Cultivation of Flower crops **Semester : V**

Theory :

Importance and scope of protected cultivation, scope in India. Different types of protective cultivation.. Plant environment interaction. Crops for green house cultivation. Green house ventilation, cooling system, green house heating, C02 enrichment, light control. Irrigation and nutrient management. Disease and pest control of green house plant. Green house production, handling packaging and marketing of green produce. Recommendations of last five years Joint Agresco.

Practical :

Study of types of greenhouses and materials required for construction of the greenhouse. Study of properties of root media containers. Study of methods of injection of C02. Methods of irrigation and nutrient application. Study of disease, pest, prevention in green house. Study of handling, packaging and marketing of green house produce. Study of cost analysis of green house plants. Visit to nearest green house.

BOOKS RECOMMENDED :

1 Progressive Floriculture - LS. Yadav and M. L. Choudhary

2 Proceedings of International seminar on protected cultivation in India held at Bangalore (1997)

3 Greenhouse Operations and management - Paul V.Nelson

4 Commercial protected floriculture by M.T.Patil and P.V. Patil. ICAR pub. New Delhi

Course No. : H/FL-354
Course Title : Protected Cultivation of flower crops

Credits : 2(1+1)
Semester : V

Lesson plan - Theory

Lesson No.	Topic	Weightage %
1	Importance and scope of protected cultivation, World scenario and prospective.	5
2	Errection of green house, Site selection, Constriction, Types of structures, cladding material use etc.	10
3	Media: Types, property, Advantage - Disadvantages	10
4	Climate control in Green house temperature, humidity, light C02 enrichment, Automation in climate control.	10
5	Irrigation and fertigation management in Green house ventilation Crops for green house cultivation.	20
6-11	Production technology of Rose, Carnation, Chrysanthemum, Gerbera, Anthodium, Orchids.	5
12	Disease and pest control of green house plant.	5
13-14	Post harvest technology of flowers : Harvesting, Pre-cooling, Packaging, Storage.	20
15	Domestic and international market of flowers, Feasibility of protected cultivation.	10
16	Recommendation of Jt. Agresco (Last 5 years)	5

Lesson Plan - Practical

Practical No.	Topic
1	Study of types of greenhouses and materials required for construction of the greenhouse
2	Study of different types of medias used for planting.
3	Climate control in green house
4-9	Practical aspects of production technology of Rose, Carnation, Chrysanthemum, Gerbera, Anthodium, Orchids.
10	Control of diseases and pests of flower crops in green house
11-12	Post harvest activities and technology in flowers : Harvesting, Pre-cooling, Packaging, Storage.
13-14	Study of cost analysis of green house plants and project report preparation.
15-16	Visit to nearest green house and production unit and market of flowers.

Course No. : H/ENT-352 **Credits : 3(2+1)**

Course Title : Inspect Pest Management of Fruit, Plantation, Medicinal and Aromatic Crops. **Semester : V**

Lecture No.	Topic	Marks	Wightage
1.	General-economic classification of insects.	5	10
2	Ecology and insect pest management with reference to fruit, plantation, medicinal and aromatic crops.	5	
3	Pest survey and monitoring and its importance in IPM.	10	
4	Distribution, host range, bio-ecology, injury integrated management of important pests affecting. Citrus : Major : Lemon butterfly, leaf miner, citrus psylla white fly and black fly, fruit sucking moth bark eating caterpillar. Minor : Aphid, Mea bug and Nematodes.	10	50
5	Mango : Major : Jassids/hoppers; fruit fly, stone weevil stem borer, mealy bugs, bark eating caterpillar. Minor : Scale, Red ants, shoot borer.	10	
6	Grapevine : Major : Flea beetle, Thrips, Mealy bug mites, Minor : Stem irdler, cockchafer beetle	10	
7	Pomegranate : Major : Fruit borer, Mealy bug, Thrips, Scale insects, white fly. Minor : Aphid, fruit sucking moth, mites, pin hole borer.	10	
8	Guava and fig : Major : Pest of Guava - fruit fly, spiraling, white fly, bark eating caterpillar. Minor: Scales, mealy bugs Fig Major : Jassids, scales, mealy bugs, Minor: Mite, stem borer.	10	
9	Banana, Papaya and Castard apple Banana Major: Root stock weevil, Aphid Minor: Burrowing nematodes Papaya Major :Aphid, whitefly Custard apple : Meal bug.	10	
10	Ber : Major : Ber fruit borer, ber fruit fly Minor : Hairy caterpillar, jassids,	10	
11	Sapota : Major: Chiku moth, Seed borer I Minor: Mealy bugs. Cashewnut : Major : Tea mosquitoMinor: Leaf eatincaterpillar	10	
12	Coconut, Arecanut and other plam trees and cashewnut Major: Rhinoceros beetle, Red palm weevil, Black headedcaterpillar, Rat. Minor: Termite, mite, scales, mealy bugs.	10	
13	Tea , Coffee	5	10
14	Apple, pear, peach, plum	5	
15	Beetlevine and Rubber	4	

H/BOT- 354 : Environmental Science and Agroecology 1+1 = 2

Environment: introduction, definition and importance. Components of environment - interactions with organisms. Global and Indian environment – past and present status. Environmental pollution and pollutans. Air, water, food, soil, noise pollution- sources, causes and types. Smog, acid rain, global warming, ozone hole, eutrophication, sewage and hazardous waste management. Impact of different pollutions and humans, organisms and environment. Introduction to biological magnification of toxins. Deforestation- forms and causes, relation to environment, Prevention and control of pollution – technological and sociological measures and solutions- Indian and global efforts. India, international and voluntary agencies for environmental conservation- major achievements. Environmental policy and legislation in India. Introduction to environmental impact assessment. Causes of environmental degradation – socio-economic factors. Human population growth and lifestyle.

Practical : Visit to local areas- river/forest/grassland/catchment etc. to document components of ecosystem, Study of common plants, insects, birds and animals. Visit to industries to study pollution abatement techniques.

Book recommended :

1. **Dhaliwal G. S. and Kler, D. S. (1995). Principles of Agricultural Ecology, Himalaya publishing Housing, Bombay.**
2. Sharma P. D. (1993), Ecology and Environment, Rastogi publication, Meerut.
3. Mishra K. C. (1993). Manual on plant Ecology, Oxford and IBH Publishing Co. New Delhi.
4. Shukla, R. S. and Chandel, P. S. (1983) Plant Ecology, S. Chand and Co. New Delhi,
5. Vasistha, P. C. (1978). A text book of Plant Ecology, Vishal Publications, Jullunder.
6. Weaver, J. E. and Clements, F. E. (1938). Plant Ecology, McGraw Hill Book Co. New York, USA.
7. Odum, E. P. (1971). Fundamentals of Ecology, Toppan Co. Ltd. Tokyo.

Course No. : H / ENGG - 351 Credits : 2(1+1)

Course Title : Farm Power and Machinery Semester : V

Lesson Plan (Theory) :

Sr. No.	Topic / Topics	Details
1	Sources of farm power in India	Human, Animal, Mechanical, electrical, Wind Power ,Scope of Mechanization.
2-3	Principle of operation of I.C. engine	I.C. engine working principles, Two and Four stroke engine, Engine terminology and examples
4-5	I.C. Engine systems	Fuel supply system ,cooling system, Air cleaner
6-7	Tractor	Tractor types and their selection, fixed and operating cost of tractors with examples
8	Tillage	Tillage, objectives of tillage, classification and types of tillage, Tillage implements
9	Primary tillage implements	M. B. plough and Disc plough with examples, ploughing of land and method of ploughing
10	Secondary tillage implements	Harrows, cultivators and examples
11-12	Seed drills	Sowing methods, seed drill, components of seed drill, seed metering mechanism, types of furrow openers, calibration of seed drill, examples
13	Study of planter	Planter, Functions, seed metering devices, type of planters
14	Plant protection equipments	Classification, types of spraying and types of dusting machines.
15	Harvesting and threshing equipments	Definition of harvesting and threshing, harvesting/threshing methods, implements and combine harvester-thresher
16	Equipment for land development and soil conservation	Clod crusher, leveler, bund former, animal drawn scoop, earth moving machinery

Practicals :

Sr. No.	Practical
1	Calculation on force, power and energy
2	Study of four stroke cycle engines.
3	Study of two stroke cycle engines.
4, 5, 6	Study of different systems of I.C. engine (Valve, Lubrication, Cooling and Power transmission systems)
7	Study of mould board plough.
8, 9	Primary and secondary tillage implements
10	Hitching, adjustments and operations
11	Study of sprayers and dusters
12	Grafting, pruning and training tools practice
13	Study of different interculturing equipments.
14	Study of harvesters
15,16	Learning of tractor driving.

H/BOT- 354 : Environmental Science and Agroecology
Lesson plan : Theory

Lesson No	Topic	Weightage
1	Environment: introduction, definition and importance.	8
2	Components of environment - interactions with organisms.	8
3	Global and Indian environment – past and present status.	8
4	Environmental pollution and pollutans. Air, water, food, soil, noise pollution- sources, causes and types. Smog, acid rain, global warming, ozone hole, eutrophication, sewage and hazardpis waste management.	10
5	Impact of different pollutions and humans, organisms and environment	8
6	Introduction to biological magnification of toxins	8
7	Deforestation- forms and causes, relation to environment	8
8	Prevention and control of pollution – technological and sociological measures and solutions- Indian and global efforts.	8
9	India, international and voluntary agencies for environmental conservation- major achievements.	8
10	Environmental policy and legislation in India.	8
11	Introduction to environmental impact assessment	8
12	Causes of environmental degradation – socio- economic factors. Human population growth and lifestyle.	10

16 &17	Insect pests of stored fruits plantation of medicinal and aromatic plants and their management.	4	5
18	IPM of stored fruits, plantation and medicinal and aromatic plants.	4	
19	Pests of Shatawari and Ashwaganda.	2	10
20	Pests of Opium and Mentha	2	
21	Pests of Wild brinjal and Sweet flag	2	
22	Pests of Cinchona, Senna, belladona	2	
23	Pests Pachouli Isabgol and Dhatura.	2	
24	Pest of Rose	2	10
25	Pests of Vetivar and Davana.	2	
26	Pests of Kevara and Citronella.	2	
27	Pests of Geranium, Palmarose and lemongrass	2	
28	Pests of Eucalyptus	2	
29	Pests of Sandalwood	2	
30	Pests of Neem, Tephrosia and Camphur	2	
31 &32	Insecticide residue problems in fruit plantation, medicinal and aromatic plants and their tolerance limits.	4	5

Course No. : H/ENT-352 **Credits : 3(2+1)**

Course Title : Inspect Pest Management of Fruit, Plantation, Medicinal and Aromatic Crops. **Semester : V**

Teaching Schedule (Practical)

Practical No.	Topic
1	Study of symptoms of damage, collection identification preservation.
2	Study of symptoms of Grapevine and pomegranate.
3	Study of symptoms of Guava, Fig and Papaya
4	Study of symptoms of Custard apple and Ber.
5	Study of symptoms of Sapota and Cashewnut.
6	Study of symptoms of Tea, Coffee and Temperate fruits.
7	Study of symptoms of Beetlevine, rubber.
8 & 9	Study of symptoms of Pests of Shatavari, Ashwagandha, Opium and Mentha
10&11	Study of symptoms of Wild Brinjal, Sweet Flag, Cinchona Senna and Belladona.
12	Study of symptoms of Pachouli, Isalgol, Davana and Vetivar.
13&14	Study of symptoms of Rose, Kevara, Citronella, Geranium.
15	Study of symptoms of Ecucalyptus, sandalwood, Neem, Tephrosia and Camphur.
16	Collection, identification and preservation of pests infesting stored fruits and medicinal plants.

Course No. : H/ ENT-353 Credits : 3(2+1)
Course Title : Inspect Pest Management of Vegetable, Ornamental and Spice Crops. Semester : V

Teaching Schedule (Theory)

Lect. No.	Topic	Marks
1	Studies on pests of potato : Tubber moth, cutworm, aphids. jassids, leaf eating caterpillar, epilachna beetle, mites.	10
2	Sweet potato and Yam : - Sweet potato : Sweet potato leaf eating caterpillar, sweet potato weevil, Yam : Yam beetle, mealy bugs, scale insects, sawfly.	10
3	Brinjal : Shoot and fruit borer, jassids, aphids, white fly, grey weevil, hadda beetle, mites.	10
4	Bell pepper-Thrips, mites, cutworm, fruit borer, whitefly capsicum.	2
5	Onion and garlic: Onion thrips, cutworm, onion fly, Earwig.	2
6	Toamto : Fruit borer, leaf eating caterpillar, white fly, mealy bugs, aphids,leaf miner.	4
7	Okra : Shoot and fruit borer, leaf roller, jassids, aphids, mites, whitely.	10
8	Peas and beans : Pod borer, aphids, stem fly, pulse beetle, mites.	5
9	Cruciferous and root crops : Diamond back moth, mustard sawfly, aphids,(Cabbage, cauliflowers, radish, carrot) cabbage butterfly, leaf miner.	10
10	Cucurbits : Fruit fly, pumpkin beetles, blister beetle, Hadda beetle.	10
11	Leafy vegetables : Cutworm, leaf eating caterpillar, aphids, leaf miner,(Amaranthus, coriander, methi, spinach, radish, salad crops) leaf hopper,mustard sawfly.	5
12 & 13	Roses : Aphids. jassids, thrips, mites scale insects, bud borer, leaf eating caterpillar, leaf cutting bees, Digger wasp, termites.	10
14	Chrysanthemum & marigold : Aphids, thrips, white fly, jassids, leaf miner, lace bug, mites, bud borer, leaf miner, slugs.	5
15	Jasmin & Tuberose : Bud worm, gallary worm, tingid bug, mites, scales,rose bud borer, aphids thrips, mites.	5
16	Aster : Leaf hopper, black blister beetle, leaf miner, aphids, mites.	5
17	Gladiolus : Seed corm maggot, aphids, thrips, mites, cutworm.	
18	Gerbera & : White fly, leaf miner, mites, leaf eating caterpillar, rose bud borer Carnation : Red spider mite, aphids, thrips, rose bud borer.	5
19	Studies on pest of lily, anthurium and orchids.	5
21 &21	Integrated pest management in polyhouse.	5
22	Studies on pests of black pepper.	5
23	Clove	5
24	Cinnamon I	5
25	Cardamom	5
26	Nutmeg and Mace	2
27	Curry leaf	2

28	Coriander, Cumin and Fennel	4
29	Turmeric and Ginger	5
30	Chilli - Thrips, mites, cutworm, aphids, termites, white fly.	5
31	Studies on polyphagous pests	4
32	Studies on non-insect pests and their management.	10

ENT-353 (2+1=3) : Insect pest Management of Vegetable, Ornamental and Spice Crops.

Theory

Sr.No	Topics	Weightage	Marks
1	Vegetable	50	40
2	Ornamental	20	16
3	Spices and condiments	20	16
4	Polyphagous	05	04
5	Non insect pest	05	04
	Total	100	80

Course No. : H/ENT-353 **Credits : 3(2+1)**
Course Title : Inspect Pest Management of Vegetable, Ornamental and Spice Crops. **Semester : V**

Teaching Schedule (Practical)

Practical No.	Topic
1	Studies on symptom and damage, identification, collection and preservation of pests of potato, sweet potato and yam.
2	Pest of brinjal.
3	Pests of capsicum, onion and garlic
4	Pests of tomato
5	Pests of okra
6	Pests of peas and beans
7	Pests of cruciferous and root crops
8	Pests of cucurbits
9	Pests of leafy vegetables
10	Pests of roses, gerbera, carnation and anthurium
11	Pests of chrysanthemum, marigold, jasmin and tuberose
12	Pests of aster, gladiolus, lily and orchids
13	Pests of black pepper, clove and cinnamon
14	Pests of cardamom, nutmeg of curry leaf
15	Pests of coriander, cumin and fennel
16	Pests of chilli, turmeric and ginger

Course No. : H/Path 354

Credits : 1(0+1)

Course Title : Mushroom culture

Practical:

Semester : V

Introduction to mushrooms fungi - nutritional value, edible and poisonous types, edible mushrooms, Pleurotus, Volvariella and Agaricus, medicinal value of mushrooms, genetic improvement of mushroom, preparation of culture, mother spawn production, multiplication of spawn, cultivation techniques, harvesting, packing and storage; problems in cultivation - diseases, pest and nematodes - weed moulds and their management strategies Economics of cultivation, post harvest technologies. Equipment and sterilization techniques for culture media, isolation of mother culture, and spawn preparation and maintenance of mushroom beds of oyster mushroom, Volvariella and Agaricus Processing and preservations of mushrooms, Economics of spawn and mushroom production and mushroom recipes.

Books / Research / Review Papers Recommended :

1. The fungi: an advanced treaties. Vol. I and II. 1973. G.C. Ainsworth, F.K. Sparrow, and A.S. Sussman, Academic Press, London.
2. Handbok on Mushrooms. 1994. N. Bahl, Oxford and IBH Publ. Co. Pvt, Ltd, New Delhi.
3. Edible Mushrooms and Their Cultivation. 1993. S.T. Chang and P.G. Miles; CBS Publ., Delhi.
4. Mushrooms. Tech. Bull. No. 17. 1994. M.C. Nair, Kerala Agricultural University, Mannuihy, Thrissur (Kerala).
5. Mushrooms-the Art of Cultivation. 1993. H. Singh. Sterling Publ. Co., New Delhi16.
6. All mushroooms are not edible. 1994. Choudhury,B.K. Intensive Intelligen. March, 1994. pp. 121-122.
7. Mushroom Cultivation. 1989. J. N. Kapoor. ICAR, New Delhi.
8. Handbook of Edible Mushrooms 1980. S. Kannaiyan and K.A. Ramasamy. Today and Tomorrow. New Delhi.
9. Oyster- A Mushroom of Broad adaptability An Overview. 1998. P.V. Wani and D.M. Sawant J. Maharashtra agric. Univ. 23(3) : 230-237.

B) Exercise schedule (Practical)

Course No. : Path 354

Exercise No	Title of Exercise : Topics to be covered
1.	Study of mushrooms: Introduction Introduction to mushrooms fungi - Edible and poisonous types.
2-3.	Commonly cultivated edible mushrooms. Edible mushrooms, Pleurotus, Volvariella and Agaricus
4.	Nutritional and medicinal value of mushrooms.
5.	Genetic improvement of mushroom.
6.	Preparation of mushroom culture: Equipment and sterilization techniques for culture media.
7.	Techniques of isolation of mushroom culture Isolation of mother culture of mushroom.
8.	Production technology of mushroom spawn Mother spawn production, multiplication of spawn.
9	Cultivation of Oyster mushroom Cultivation techniques, maintenance of mushroom beds, harvesting, packing and storage. : Oyster mushroom.
10.	Cultivation of paddy straw mushroom Cultivation techniques, maintenance of mushroom beds, harvesting, packing and storage : Volvariella.
11-12.	Cultivation of button mushroom. Cultivation techniques, maintenance of mushroom beds, harvesting, packing and storage : Agaricus
13	Management of mushroom diseases, insect pests and nematode, weed moulds and their management strategies.
14.	Processing and preservation of mushrooms.
15.	Preparation of mushroom recipes.
16.	Economics of mushroom production
17.	Visit to mushroom project / industry in the region/jurisdiction of university

Course No. : H / ENGG - 351 **Credits : 2(1+1)**

Course Title : Farm Power and Machinery (B.Sc. Horticulture) **Semester : V**

Theory :

Sources of farm power in India Human, Animal, Mechanical, electrical, Wind Power ,Scope of Mechanization, Principle of operation of I.C. engine I.C. engine working principles, Two and Four stroke engine, Engine terminology and examples, I.C. Engine systems Fuel supply system, cooling system, Air cleaner, Tractor Tractor types and their selection, fixed and operating cost of tractors with examples, Tillage Tillage, objectives of tillage, classification and types of tillage, Tillage implements, Primary tillage implements M. B. plough and Disc plough with examples, ploughing of land and method of ploughing, Secondary tillage implements Harrows, cultivators and examples, Seed drills Sowing methods, seed drill, components of seed drill, seed metering mechanism, types of furrow openers, calibration of seed drill, examples, Study of planter Planter, Functions, seed metering devices, type of planters, Plant protection equipments Classification, types of spraying and types of dusting machines, Harvesting and threshing equipments Definition of harvesting and threshing, harvesting/threshing methods, implements and combine harvester-thresher, Equipment for land development and soil conservation Clod crusher, leveler, bund former, animal drawn scoop, earth moving machinery.

Practical :

Calculation on force, power and energy, IC engines - showing the components of dismantled engines, Primary and secondary tillage implements, hitching, adjustments and operations, Plant protection equipments, Grafting, pruning and training tools practice, Inter-culture equipment, harvesting equipments, tractor driving.

Books Recommended :

1. Farm Machinery and Equipment : Nakra C P 1970, Dhanpat Rai & Sons, New Delhi,
2. Agricultural Machines : Kenin N I Popov I F and Sakun VA 1985, .
3. Elements of Agricultural Engineering :Jagdishwar Sahay 1992, Agro Book Agency, Patna
4. Principals of Agricultural Engineering : Michael A M and Ojha T P 1993,
5. Principals of farm machinery : Kepner R A, Roy Bainer and Barger B L 1978, CBS Publishers and Distributors, Delhi-110032
6. Machinery - An approach : Jain SC 2003 Standard Publishers Distributors, Delhi-110006