

POST GRADUATE SYLLABUS

(Prepared from ICAR PG Syllabus of Horticulture)

Degree to be awarded

M. Sc. (Hort.) in Plantation Crops and Processing

Department of Plantation Crops and Processing

FACULTY OF HORTICULTURE

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PG (M.Sc. (Hort.) and Ph.D.) Courses at a glance:

SL.NO.	Course Code	Course Title	Credit Hours	To be offered in Sem.
(A) M.Sc.(Hort.)				
1.	PCP-501*	PRODUCTION TECHNOLOGY OF PLANTATION CROPS-I	3(2+1)	1 st
2.	PCP-502*	PRODUCTION TECHNOLOGY OF PLANTATION CROPS-II	3(2+1)	2 nd
3.	PCP-503*	PRODUCTION TECHNOLOGY OF PLANTATION CROPS-III	2(1+1)	1 st
4.	PCP-504*	BREEDING OF PLANTATION CROPS	3(2+1)	3 rd
5.	PCP-505*	PROCESSING OF PLANTATION CROPS-I	3(2+1)	1 st
6.	PCP-506*	PROCESSING OF PLANTATION CROPS-II	3(2+1)	2 nd
7.	PCP-507*	ORGANIC PRODUCTION TECHNOLOGY OF PLANTATION CROPS	3(2+1)	4 th
8.	PCP-591*	MASTER'S SEMINER	1(1+0)	3rd
9.	PCP-599	MASTER'S RESEARCH(Non-Credit)	2(0+20)	
Total			21(14+7)	
(B)Ph.D.				
1.	PCP-601**	ADVANCES IN PRODUCTION OF PLANTATION CROPS-I	3(2+1)	1 st
2.	PCP-602**	ADVANCES IN PRODUCTION OF PLANTATION CROPS-II	3(2+1)	2 nd
3.	PCP-603**	ADVANCES IN BREEDING OF PLANTATION CROPS	3(2+1)	3 rd
4.	PCP-604**	ADVANCES IN PROCESSING OF PLANTATION CROPS-I	3(2+1)	1 st
5.	PCP-605**	ADVANCES IN PROCESSING OF PLANTATION CROPS-II	3(2+1)	2 nd
6.	PCP-606**	BIOTECHNOLOGY OF PLNTATION CROPS	3(2+1)	4 th
7.	PCP-691	DOCTORAL SEMINAR-I	1(1+0)	3 rd
8.	PCP-692	DOCTORAL SEMINAR-II	1(1+0)	4th
9.	PCP-699	DOCTORAL RESEARCH (Non Credit)	45(0+45)	
Total			20(14+6)	

*Compulsory for M.Sc. (Hort.) Programme

**Compulsory for Ph.D. Programme

Revised PG Syllabus, 2011

A) For M.Sc.(Hort.)

1) PCP-501 PRODUCTION TECHNOLOGY OF PLANTATION CROPS-I 3(2+1)

Theory:

Introduction-Definition, role of plantation crops in National economy; Area, production, productivity, export and import; Centre of origin, Botanical characteristics, classification and varietal wealth. Soil and climatic factors on crop growth and productivity, their problems; Plant propagation, planting and after care, bringing to bearing; nutritional management-macro and micro nutrients, deficiency symptoms, physiological disorders, role of growth regulator, water requirements, fertigation, water management- drainage and irrigation, shade regulation, weed management, training and pruning, crop regulation, maturity indices, harvesting. Uprooting and replanting; various production problems- weeds, pests and diseases, their management; Multitier cropping, photosynthetic efficiencies of crops at different tiers, cost benefit analysis; Organic farming, management of drought, precision farming.

Crops: Tea, Cocoa, Rubber, Coconut, Betel vine

Practical:

Description of botanical and varietal features, selection of elite/ mother plants and seedlings, soil test crop response studies and manuring practices, pruning and training, maturity standards, harvesting, Project preparation for establishing nursery and plantations, visit to plantation.

2) PCP-502 PRODUCTION TECHNOLOGY OF PLANTATION CROPS-I I 3(2+1)

Theory:

Introduction, importance, historical accent, present status- national and international, future prospects, botany and taxonomy, climatic and soil requirements, commercial varieties/hybrids, site selection, layout, sowing/ planting times and methods, nutritional and irrigation requirements, intercropping, mixed cropping, intercultural operation, weed control ,mulching, physiological disorders, harvesting, post harvest management, plant protection measures and seed planting material and micro-propagation, precision farming, organic resource management, organic certification, quality control.

Crops: Coffee, cashew nut, Areca nut and Oil palm

Practical: Identification of seeds and plants, botanical description of plant; preparation of herbarium, propagation, nursery raising, field layout and method of planting, cultural practices, harvesting.

3) PCP-503 PRODUCTION TECHNOLOGY OF PLANTATION CROPS-III 3(2+1)

Theory:

Introduction, importance, historical accent, present status- national and international, future prospects, botany and taxonomy, climatic and soil requirements, seed rate and seed treatment, nutritional and irrigation requirements, intercropping, mixed cropping, intercultural operation, weed control ,mulching, physiological disorders, harvesting, post harvest management, plant

protection measures and seed planting material and micro-propagation, precision farming, organic resource management, organic certification, quality control.

Crops: Cinchona, Chicory and Palmyrah

Practical: Identification of seeds and plants, botanical description of plant; preparation of herbarium, propagation, nursery raising, field layout and method of planting, cultural practices, harvesting.

4) PCP-504 BREEDING OF PLANTATION CROPS

3(2+1)

Theory:

Species and cultivars, cytogenetic, survey, collection, conservation and evaluation, floral biology, breeding objectives, approaches for crop improvement, introduction, selection, hybridization, mutation breeding, polyploidy breeding, improvement of quality traits, resistance breeding for biotic and abiotic stresses, in-vitro multiplication, haploid culture, protoplast culture and fusion induction of somaclonal variation and screening the variants, molecular aided breeding and biotechnological approaches, marker assisted selection, bioinformatics, IPR issues, achievements and future thrusts.

Crops: Tea, coffee, coconut, arecanut, cashew, cocoa, rubber, palmyrah, oil palm, cinchona, chicory.

Practical: Characterization and evaluation of germplasm accessions, blossom biology, studies on pollen behavior, anthesis; fruit set; selfing and crossing techniques; description of varieties salient features of improved varieties and cultivars from public and private sector, practices in hybridization, polyploidy breeding, mutation breeding, evaluation of biometrical traits and quality traits, screening for biotic and abiotic stresses, visit to biotechnological/radio tracer laboratory national institutes for plantation crops and plant genetic resource centres, genetic transformation in plantation crops for resistance to biotic and abiotic stresses/quality improvement.

5) PCP-505 PROCESSING OF PLANTATION CROPS – I

3(2+1)

Theory:

Introduction, principles and practices of post harvest technology of plantation crops, commercial uses of plantation crops. Processing of major produce from plantation crops, processing and value addition, grading, packing and storage.

Crops: Tea, Cocoa, Rubber, Coconut, Betel vine.

Practical: Study of processing of different plantation crops and storage. Value added products from plantation crops.

6) PCP-506 PROCESSING OF PLANTATION CROPS – II

3(2+1)

Theory:

Principles and practices of post harvest technology of plantation crops, commercial uses of plantation crops. Processing of major produce from plantation crops.

Crops: Coffee, cashew nut, Areca nut and Oil palm, cinchona, chicory, palmyrah.

Practical: Study of processing of different plantation crops and storage. Value added products from plantation crops.

7) PCP-507 ORGANIC PRODUCTION TECHNOLOGY OF PLANTATION CROPS 3(2+1)

Theory:

Importance, principles, perspective, concept and component of organic production of plantation crops. Managing soil fertility, pest, diseases and weed problems in organic farming system; crop rotation in organic horticulture, processing and quality control for organic food. Methods for enhancing soil fertility, mulching, raising green manure crops. Indigenous methods of compost, panchagavya, biodynamics, preparation etc; pest disease management in organic farming; ITK's in organic farming. Role of botanicals and biocontrol agents. GAP and GMP-certification of organic products; organic production and export opportunity and challenges.

Practical:

Method of preparation of compost, vermicomposting, bio fertilizers, soil solarization, bio pesticides in horticulture, green manuring, mycorrhizae and organic crop production, waste management, organic soil amendment for root disease, weed management, in organic horticulture. Visit to organic fields and marketing centres.

B) For Ph.D.

1) PCP-601: ADVANCES IN PRODUCTION TECHNOLOGY OF PLANTATION CROPS-I 3(2+1)

Theory:

Plantation crops- area and production, export potential-varietal wealth and appraisal on the crop improvement in plantation crops. Mass multiplication techniques, High density planting, systems of cultivation, multitier cropping, companion cropping, studies of on canopy and root management, photosynthetic efficiencies of crops at different tiers, biotic and abiotic factors on growth and productivity, nutritional requirements, role of macro and micro nutrients, Nutrient deficiency symptoms, growth regulators, water requirements, fertigation, soil and moisture conservation practices, Drought management, permanent vegetation management, Basin management, training and pruning, maturity indices, harvesting; role of commodity boards in plantation crop development, Production of plantation crops through GAP, GMP, HACCP.

Crop: Tea, Cocoa, Rubber, Coconut, Betel vine and Palmyrah.

Practical:

Description of botanical and varietal features; selection of mother palms and elite clones; nursery techniques and propagation methods, High density planting, training and pruning practices,

fertigation and foliar nutrition, shade regulation, maturity standards, harvesting, curing, processing and grading, project preparation for establishing new plantations, visit to plantation gardens, commodity boards and plantation based industries.

2)PCP-602: ADVANCES IN PRODUCTION TECHNOLOGY OF PLANTATION CROPS-II 3(2+1)

Theory:

Current status on area and production- state, national and global scenario, global trade, problems encountered in productivity, systems of cultivation, varieties, soil and climate, propagation techniques and nursery management, planting systems and methods, weed management, canopy, INM practices, irrigation and fertigation techniques, chemical regulation of crop productivity, IPM, harvesting, GAP and GMP for production. Precision farming and organic farming. Commodity Boards- their role.

Crops: Coffee, Cashew nut, Areca nut, Cinchona, Chicory and Oil palm.

Practical:

Propagation techniques and nursery management, planting systems and methods, weed management, canopy, INM practices, irrigation and fertigation techniques, chemical regulation of crop productivity, IPM, harvesting, GAP and GMP for production. Precision farming and organic farming.

Crops: Coffee, Cashew nut, Areca nut, Cinchona, Chicory and Oil palm.

3) PCP-603: ADVANCES IN PROCESSING OF PLANTATION CROPS-I 3(2+1)

Theory:

Recent advancement in processing technology of the following Plantation crops with relation to Processing of major produce from plantation crops, processing and value addition, grading, packing and storage.

Crops: Tea, Cocoa, Rubber, Coconut, Betel vine, Palmyrah.

Practical:

Recent advancement in processing technology of the following Plantation crops with relation to Processing of major produce from plantation crops, processing and value addition, grading, packing and storage.

4) PCP-604: ADVANCES IN PROCESSING OF PLANTATION CROPS-I I 3(2+1)

Theory:

Recent advancement in processing technology of the following Plantation crops in relation to Processing of major produce from plantation crops, processing and value addition, grading, packing and storage.

Crops: Coffee, Coconut, Areca nut, Chicory, Cinchona and Oil palm.

Practical:

Recent advancement in processing technology of the following Plantation crops in relation to Processing of major produce from plantation crops, processing and value addition, grading, packing and storage.

Crops: Coffee, Coconut, Areca nut, Chicory, Cinchona and Oil palm.

5) PCP-605: ADVANCES IN BREEDING OF PLANTATION CROPS 3(2+1)

Theory: Evolutionary mechanisms, adaptation and domestication, genetic resources, genetic divergence, cytogenetics, variations and natural selection, types of pollination and fertilization mechanisms, sterility and incompatibility system, recent advances in crop improvement efforts, introduction and selection, chimeras, clonal selections, intergenetic, interspecific and intervarietal hybridization, heterosis breeding, mutation and polyploidy breeding, resistance breeding to biotic and abiotic stresses, breeding for improving quality, genetics of important traits and their inheritance pattern, molecular and transgenic approaches and other biotechnological tools in improvement of selected spice and plantation crops.

Description and cataloguing of germplasms, pollen viability tests, pollen germination, survey and clonal selection, screening techniques for abiotic stresses, screening and rating for pest, diseases and stress resistance in hybrids, estimation of quality and processing characters for quality improvement, uses of mutagens and colchicines for inducing mutation and ploidy changes, practices in different methods of breeding and in- vitro breeding techniques.

Practical:

Description of crops and cultivars, cataloguing of species and cultivars, floral biology, selfing and crossing, evaluation of hybrid progenies, induction of economic, colour mutants, increased alkaloid content in medicinal crops, high essential oil content in aromatic plants, Physical and chemical mutagens, induction of polyploidy, screening of plants for biotic and abiotic stresses and environmental pollution, in-vitro breeding in flower crops, medicinal and aromatic crops.

6) PCP-606: BIOTECHNOLOGY OF PLANTATION CROPS 2(1+1)

Theory:

Biotechnological approaches for crop improvement of plantation crops. In-vitro culture methods and molecular approaches for crop improvement in plantation crops, production of haploids, disease elimination in horticultural crops, micro grafting, somaclones and identification of

somaclonal variants, in-vitro techniques to overcome fertilization barriers, in-vitro production of secondary metabolites.

Protoplast culture and fusion, construction, identification and characterization of somatic hybrids and cybrids, wide hybridization, embryo rescue of recalcitrant species, in-vitro conservation of plantation crops. In-vitro mutation for biotic and abiotic stresses, recombinant DNA methodology, gene transfer methods, tools, methods, application of rDNA technology, quality improvement; improvement for biotic and abiotic stresses; transgenic plants. Role of molecular markers in characterization of transgenic crops, finger printing of cultivars etc; achievements, problems and future thrusts in horticulture biotechnology.

Crops: Coconut, Oil palm, Coffee, Tea, Cocoa.

Practical:

Establishment of axenic explants, callus initiation and multiplication; production of suspension culture, cell and protoplast culture, fusion, regeneration and identification of somatic hybrids and cybrids, identification of embryonic and non-embryonic calli, development of cell lines; in-vitro production and characterization of secondary metabolites, isolated microspore culture, isolation and amplification of DNA, gene transfer methods; molecular characterization of transgenic plants.