SYLLABUS FOR THE TRADE
OF

FLORICULTURE & LANDSCAPING

UNDER
CRAFTSMEN TRAINING SCHEME (CTS)

Revised in
YEAR – 2012

By

Government of India
Ministry of Labour & Employment (D.G.E.&T.)
CENTRAL STAFF TRAINING AND RESEARCH INSTITUTE
EN- 81, Sector-V, Salt Lake City
Kolkata-700 091

List of members attended the Trade Committee Meeting to revised the syllabus for the trade of *"FLORICULTURE & LANDSCAPING "* under C.T.S. held on 27.12.2011 at HDF Gramin ITC, Orissa

Sl. No	Name	Name of the Organization	Remarks
1	Mr. Ranjan Kumar Das Mohapatra, Dy. Director of Horticulture,	Dept. of Horticulture, Mayurbhanj	Chairman
2	Mr. L.K. Mukherjee, Deputy Director	CSTARI, Kolkata	Member
3	Dr. Keshaba Charana Panda, Principal	HDF Gramin ITC, Mayurbhanj	Convener
4	Mr. Sudershan Mohanty, Dypt.Director Agriculture	Dept. of Agriculture, Mayurbhanj	Member
5	Mr. Jagannath Patra, Programme Co-ordinator	Krushi Vigyan Kendra, Mayurbhanj	Member
6	Mr. Sarat Chandra Sethy, District Agriculture Officer	Dept.of Agriculture , Betnoti	Member
7	Mr. Sudam Kumar Nayak, Plant Protection Officer	Dept.of Agriculture , Betnoti	Member
8	Mr. Ch. Swapan Ku. Mohapatra, Director	HDF Gramin ITC, Mayurbhanj	Member
9	Mr. Sudarshan Das, Secretary	HDF, Bhubaneswar	Member
10	Mr. Bhupati Kumar Patra, Vice Principal	HDF Gramin ITC, Mayurbhanj	Member
11	Mr. Bijay Ku. Das, Lecturer	HDF Gramin ITC, Mayurbhanj	Member
12	Mr. Sachindra Dalabehera, Lecturer	HDF Gramin ITC, Mayurbhanj	Member
13	Dr. Ranjay Ku. Giri, Lecturer	HDF Gramin ITC, Mayurbhanj	Member
14	Mr. Pradeep Chandra Das, Lecturer	HDF Gramin ITC, Mayurbhanj	Member
15	Mr. Shubhadeep Bera, Co-Ordinator	HDF Gramin ITC, Mayurbhanj	Member
16	Mr. Bishnupada Bhowmick, Lecturer	HDF Gramin ITC, Mayurbhanj	Member
17	Mrs. Sanghamitra Pattanayak, Scientist Hort.	Krushi Vigyan Kendra, Mayurbhanj	Member

GENERAL INFORMATION

1. Name of the Trade : Floriculture & Landscaping

2. N.C.O. Code No. :

3. Duration of Craftsmen Training : One year

4. Entry Qualification : Passed 10^{th} Class Examination

5. Unit Size : 20

6. Space norms : Workshop:10000 Sq meter.

7. Power Requirement : 3 KW

8. Instructors qualification : (i) B.E./B.Tech (Agriculture) with one year Experience in the relevant field.
OR

(ii) BSc (Ag/Hort) with two years relevant field
OR

(iii) National Trade Certificate in the trade of Horticulture or Floriculture and Landscaping with five years experience in the relevant field.

9. Desirable qualification : Preference will be given to a candidate with CITS.

Syllabus for the Trade of *"Floriculture & Landscaping"* under C.T.S.

Duration : One Year

Agro meteorology

Week	Trade Practical	Trade Theory
1-4	Identification of meteorological instruments. Demonstration for recording of a) Rainfall, b) Temperature, c) Humidity, d) Wind direction and speed, e) Evaporation and f) Sunshine hours. (ii) Installation of the above instruments. (iii) Recording meteorological data. Visit to agro-meteorological Stations.	a) Importance of different elements of weather and climate in agriculture – rainfall, temperature, humidity, sunshine, wind speed and direction. b) Weather and climate of related state of the country – Annual and Seasonal pattern relating crop season, highlighting seasonal variation, Winter – Rabi, Summer – Pre – kharif, Monsoon – maturity and harvesting of Kharif crops and field preparation and sowing of Rabi crops. c) Brief idea about Special weather phenomena and hazard weather events viz, cyclonic storm and storm surge, flood, drought, heat and cold wave, hail storm, western disturbances and associated weather events : Their nature, period and areas of occurrence and effect on crops and crop management. Weather forecast & its implication.

Basic Knowledge On Plant Biology

5-6	Germination, parts of roots, stems, flowers and seeds. Identification of families/varieties.	Morphology, Physiology and other preliminary knowledge.
7-9	**Soils and Soil Management -** Visual identification of textural type of soils. Collection of soil samples, procedure for sending samples to Soil Testing Laboratory. Interpretation of soil testing results and fertilizer recommendation. Practicing different methods of correction of soil acidity, such as liming, sludge, wood ash, dolomite, basic slag, rock phosphate with frequency and rate of application. Study of soil particles – salt, silt, clay. Study soil porosity. Study bulk and particle density of soil. Study soil types based on textural classes.	Texture (definition, particle size of soil ingredients i.e. sand, silt, clay) classification and importance. Porosity, bulk density & particle density.
	Study different structures of soil. Study soil reaction-Measurement of pH by litmus method and using	Structure (definition, classification, importance), water

	electronics devices. Study water holding capacity of soil.	holding capacity, pH, EC, CEC, Soil solution, Soil classes on the basis of agro climatic zones.
	Visit to acid soil and saline soil areas and identification of field problems. Visit to a soil testing laboratory and use of soil testing kit	Acid, Alkaline and Saline soils : (i)Definition, ii) Causes, iii) Problems and (iv) Methods of correction.
	Practice method of correction of acid soil by application of various materials such as lime, sludge, wood ash, dolomite, basic slag, rock phosphate.	Acid Soils – different methods of correction of soil acidity, such as liming, sludge, wood ash, dolomite, basic slag, rock phosphate - their composition, frequency and rate of application.
	Practicing methods of corrections through improvement of drainage, flushing, leaching and scrapping. Practicing methods to combat the salinity problems. Adoption of different agronomic practices such as ridge and furrow methods of sowing and irrigation.	Saline soils – Corrections through improvement of drainage, flushing, leaching, scrapping. Methods to combat the salinity problems. Adoption of different agronomic practices such as ridge and furrow methods of sowing and irrigation, growing of salt tolerant crops.
	Practice correction methods through application of Sulphur and Gypsum – frequency and rate of application.	Alkaline soils – Correction through application of Sulphur and Gypsum – frequency and rate of application.
	Role of organic matter in soil and its recycling - Collection and use of Azolla, BGA and its multiplication. Study of recycling of organic matter.	a) Concept of soil organic matter – humus. b) Role of organic matter (OM): Effect of OM on soil properties such as structure. Effect of OM on soil micro-organisms. Effect of OM on soil fertility. c) Recycling of OM in the field. d) C/N Ratio of Soil and organic matter.
10-14	**Soil fertility, Manures and Fertilizers, Fertility Management -** Practice of Integrated Nutrient Management System (INMS) in the field. Awareness on occupational health hazards and safety related to the trade.	a) Soil fertility, productivity and its maintenance. Concept and practices of INMS. b) Different types of manures such as compost (NADEP compost, Vermi compost), FYM, Sludge, Poultry manure : Their nutrient contents and role in improving soil and soil fertility.
	Identification of seeds of Green Manuring crops. Identification of different Green Manuring crops – Dhaincha, Kalai, Cowpea, Subabul, Glyricidia. Demonstration and incorporation of green manuring crops.	c) Green manure – Role of Green Manuring in crop production. Green manuring , its principles, methods and practices. Different types of Green Manure crops. Cultivation of important G.M crops such as Dhaincha, Kalai, Cowpea, Sunhemp, Glyricidia.

	Identification of bio-fertilizers. Preparation of bio-fertilizers. Practice of bio-fertilizers, application, techniques.	d) Bio-fertilizer – i) Concept and classification. ii) Use of bio-fertilizer as Azolla, Blue-green algae, Rhizobium, Azotobactor, Phosphate and Potash solubilizing bacteria and mycorrhiza– their propagation, source of availability, application and limitations.
	Field diagnostic study for deficiency symptoms of nutrient elements.	e) Essential plant nutrient elements - Role of Major and Minor plant nutrient elements. Deficiency symptoms.
	Identification of fertilizers and micronutrient containing chemicals.	f) Chemical Fertilizers : i) Classification (both macro and micro-nutrient containing fertilizers), nutrient contents.
	Practice application of fertilizers and manures by various means.	ii) method of fertilizer application: Broadcasting, Band and furrow placement, Ring placement, Foliar spray – their advantages and disadvantages. iii) Time of fertilizer application.
	Study of leaching, run-off, chemical and biological fixation of nitrogen. Study of nodulation.	g) Depletion of Soil fertility : i) Factors affecting such as leaching, run-off, chemical and biological fixation of nitrogen, de-nitrification, volatilization, crop removal.
	Practice cultural methods such as recycling or application of crop residue, ploughing, leveling, application of organic matter, fertilizers and soil amendments, crop rotation and adoption of appropriate cropping systems for maintenance of soil fertility.	ii) Maintenance of soil fertility : through adoption of cultural methods such as recycling or application of crop residue, ploughing, leveling, application of organic matter, fertilizers and soil amendments, crop rotation and adoption of appropriate cropping systems.
15-19	**<u>Fundamentals of Floriculture</u>** Common garden operations using different implements. Identification & practice Bio-fertilizer.	Introduction and scope; branches of industry Present situation & scope in India, (Cut flowers, pot plants, seeds and bulbs, essential oil Landscaping, interior scaping).
	Handling of soils, purpose of nursery bed, potting media, potting etc.	Soils and other media, manures and fertilizers, Irrigation. Bio-fertilizer
	Propagation by cutting, budding, greating. Audio Visual demonstration. Systematic waste disposal keeping environment pollution in view.	Environmental factors, ecological physiology, photo periodism, dormancy, growth regulators. - Cultivation under protection. - Garden implements and important operations, control of diseases, insects and weeds.

		- Methods of propagation. - Time of Propagation.
	Handling of seeds, bulbs, cut flowers, nursery plants, pot plants. Audio Visual demonstration.	Methods of seeds & bulbs collection and storing. Post harvest technology of cut flowers, seeds, bulbs .
	Acquaintance with soil types, various manures, fertilizers, Vermi compost, pesticides, growth regulator.	Irrigation & Water management. Including micro irrigation techniques like drip, sprinkler, fogger, fustigation, etc
20-22	**<u>Nursery and Seed Production</u>:-** Studying and identification of seeds & testing viability. Seed treatment, soil treatment before sowing. Studying seed sowing in beds and containers. Studying different media, soil mixture for raising plants by seeds, cutting. Methods of different types of seed sowing. Transplanting or potting the seedling in the pots, polythene bags and in other containers. Studying of floricultural tools used in maintenance and in propagation. Studying propagation by runners, suckers, off shoots & other vegetative means.	Introduction : Importance of Nursery and seed production, selection of site for open and covered culture. Soil preparation, soil sterilization, propagating structures, preparation of soil mixture for seed sowing and pot plants. Seed production methods for pure seed, open seed, cross pollinated seed and hybrid seed, harvesting, cleaning, seed testing, germination test and packing. Seedling production methods for annuals and other herbaceous ornamentals and their methods of packing. Selection of Nursery sites & structures.
	Studying the propagating materials – their harvesting and storing etc. Preparing of Nursery plants by various vegetative methods & their maintenance.	Bulb / Corn production and storage methods for Gladiolus, Tuberose, Freesia, Dahlia, Amaryllis, Begonia, Glaxonia, Football Lily, Day lily, Spider lily and other lilies, Crinum, Daffodil and Narcissus, Iris, Caladium, Tulip, Cannas and Zephyr lily etc. Methods of harvest, protection, storage and packing.
	Practicing simple and tongue layering, ground layering, air layering or gootee. Practicing leaf cutting and leaf bud cutting. Transplanting of rootstock for preparing grafts. Practicing various budding methods on different rootstock at different times. Harvesting different types of seed. Repotting of pot bound plants Pinching, disbudding and application of growth regulators.	Pot Plants : Important foliage plants. Flower plants, Cacti, Succulents, Palm, Conifers and their methods of propagation, maintenance and packing. Lawn grasses : Seed and turf for plains, hills and coastal regions. Seed and turf production and their methods of packing and supply. Landscape plants : Trees, Shrubs, Climbers, ground covers. Hedge and edge plants, bamboos. Rock plants, ater plants and their propagation and packing methods. Method of production of Herbaceous rooted

		cuttings/suckers- Chrysanthemum, Carnation, Dahlia, Gerbera, and Anthurium etc. Methods of production of budded / grafted plants – Rose, Bougainvillea, Hibiscus.
	Studying Bonsai plants, containers and methods of making, preserving, watering, disease and pest, packing etc. Grading of container grown plants. Studying packing of seed, seedlings, rooted cuttings pot plants, Lawn grass, Trees, Shrubs – Cacti, Bonsai. Studying different types of boxes used for packing.	Bonsai: Importance, Criteria for selection of plants, various steps in Bonsai & forest. Methods of making Bonsai containers and soil potting & repotting. Training, pruning and punching; watering, manuring, pest and diseases and their control & methods of packing .
23-24	**<u>Planting Materials and their Cultivation Practices</u>** Method of identifying major types of ornamental plants – Flowering (Trees, Shrubs, Climbers, Cacti, Succulents, House plants etc.) Pruning and shaping of the plants. Identification of indoor and bonsai plants. Other cultural practices like planting time and distances and methods of planting, nutrition, irrigation & plant protection. Culture of Pot plants. Identification of weeds and their control. Making of herbaceous and shrubbery borders.	Importance of identification and classification. Description of the categories of ornamental plants, lawns, pot plants, cut flower crops, bulbous plants, annuals and other bedding plants, rock garden plants and aquatic plants. Cultural practices : soil and climate, land preparation and planting, manuring, irrigation and other intercultural operations. Control of insect pests, diseases and weeds. Detailed study (plant height, shape and spread; flower colour, time and blooming duration foliage/fruit/bark beauty, hardiness, deciduous/evergreen) and uses of important species of each category wherever applicable. Landscape plants : a) Trees, b) Lawn, c) Shrubs, d) Hedges, e) Edges, f) Climbers, g) Pot plants, h) Cut flower crops,i) Annuals and other bedding plants, j) Bulbous plants, k) Flock gardens, l) Aquatic plants etc.
25-33	**<u>Commercial Flowers</u>** Identification and study of important commercial varieties of the flowering crops. Preparation of ground and beds for planting specific flower crops. Top dressing (application of fertilizers for specific flower crops). Pinching and disbudding in specific flower crops. Providing support and training for specific crops. Use of growth regulators, preparation of solutions and applications. Identification of pests and diseases. Preparation of solutions and application of sprays or dusts. Study of quality parameters for cut flowers for domestic markets and for export. Study of pulsing solutions and holding of cut flowers. Harvesting, conditioning and storage of cut flowers.	Scope, importance, cultivars, soil and climatic requirements, propagation, nutrition and water management, management of insect pests, diseases and weeds, specific cultural operations, harvesting, grading, pulsing, storage. Packing of the following commercially important flowers : For losse flowers: Jasmines, Chrysanthemums, Rose, Crossandra, Barleria, Balsam, Marigold, China aster, Tuberose, Garenias, Dahlia, Hibiscus. For long stem cut flowers : Perennials : Rose, Gladiolus, Carnation, Gerbera Chrysanthemums. Orchids, Anthuriums, Water lilies, Freesia, Iris, Lilium amaryllis, Tulip, Hyacinth, Tuberose, Haemanthus, Dahlia,

	Study of packing materials – wrapping and tying materials, packing cartons. Packing of cut flowers for local and out station markets and for export. Study of poly houses, net houses, tunnels etc. for cultivation under cover, and preparation of estimates and plans. Control of temperature, humidity, and light in covered structures. Preparation of flowers for display for flower shows. Visit to Commercial Nurseries, Cut flower production Enterprises, Flower Shows, Flower Markets.	Narcissus, Hemerocallis Sterlitzia, Helicormia. Annuals : Antirrhinum, Aster, Delphinium, Dianthus, Centauria, Celosia, (Cockscomb) Helichrysum, Gazenia, Statice Gomphrena, Stock, Candytuft, Gypsophila. Cut Greens: Asparagus, Ferns, Grevillea, Callistemon, Solidago, Palms, Cycad, Thuja, Lemon grass; Prunus, Russelia. Specific cultural requirements for certain crops (Chrysanthemum, Carnation, Rose, Marigold) such as pinching, disbudding, regulation Scheduling/forcing of flowering, use of growth regulators. Cultivation under cover such as Poly & Net Houses and specific requirements of control of light temperature & humidity for flower crops such as Chrysanthemum, Carnation, Rose, Orchids.
34-43	**<u>Landscaping & Indoor Gardening</u>** Tours, surveying and drafting. Preparation and execution of land scape plants. Maintenance of gardens and lawns. Accessories and containers for Flower arrangements. Floral arrangement. Preparation of floral ornaments, bouquets etc. Preparation of bottle gardens, terrarium etc. Maintenance and recycling of indoor pot plants.	Importance and scope. History & styles of gardens, famous gardens. Application of elements and principles. Features and components of gardens. Home gardens and garden structures. Enrichment items and right lighting. Soil ,water and energy conservation through Landscaping. Selection of plants based on landscape value and uses. Maintenance of gardens and lawns. Avenue trees. Indoor gardens, terrace gardens, window gardens, trough/bottle garden, aquarium ,baskets, mini landscape, Rock Gardens. Selection and arrangements of indoor pot plants, their care and recycling. Preparation of Garden competitions and Flower Shows. Preparation for Floral ornaments – Garlands, Bangles, Crowns, Veni, Rangoli; baskets and bouquets, button holes, corsages. Principles and styles of flower arrangement, characteristics of Oriental, Western and Japanese (Ikebana) arrangements. Conditioning of cut flowers and cut greens for arrangement. Drying of plant material and selection of additional items used in flower arrangements. Prolonging self life of Vase flowers.
44	Protected Cultivation of flowers	Poly house, shed net house, mulching

	Identification and study of poly house, shed net house, mulching.	
45-46	***Apiary*** Familiarisation with species of honey bees & different types colony organization and bee boxes	**Knowledge of General Safety, health and hygiene Concepts and Brief history of modern bee keeping.** **Honey bee as useful insects, species of honey bee, their nesting behaviour**
	Capturing bee colony from natural source	Relation between flowers & honey bees & their interdependence. Selection of Apiary side, important of bee resources & agricultural crops
	Colony handling & inspection, maintenance of its record	Description of different types of bee boxes & equipments
	Identify Enemies of bees, robbing fighting, cleaning of bee box & diseases	Mellifera bee keeping
	Swarm control, colony division, queen cell, emergency cell	Seasonal bee management swarming & swarm control dividing, re-queening
	Migration of colony, packing & mixing	Migration of bee box, dearth period & its control, Feeding. Honey bee pollination & its advantages
	Use of bee equipments like queen gate, smoker, bee Vail, drone trap	Bee products – honey, bee wax, royal jelly, bee pollen & bee venom,
	Honey extraction from bee box	Economics of bee keeping, financial assistance from financial Institute & Banks etc.
	Preparation of comb, removal of old combs, fixing of comb foundation sheet	Bee keeping as hobby or commercial basis or semi commercial basis.
	Manual Honey processing, quality control & storing of honey	Medicinal & food values of honey, granulations & farmantation of honey, their prevention & uses.
	Extraction of bee wax & visit to local Apiaries	Qualiy concept and Agmark Certification. Do‟s and Don‟t‟s in bee keeping
47-52	**Workshop**	**Group Discussion**
	Project preparation.	**Book Keeping, Market Study & Entrepreneurship development**
	Revision and Test	

LIST OF TOOLS & EQUIPMNT
for the trade of "Floriculture & Landscaping"

(Unit Size : 20)-

Tools and Equipments for two batches

Sl. No.	Description of Item	Quantity
Tools & Implements		
1.	Kassi / Spade	21 nos.
2.	Khurpi	21 nos.
3.	Hand hoe	21 nos.
4.	Saw	21 nos.
5.	Watering Can	05 nos.
6.	Rose Can	05 nos.
7.	Grass Cutter	20 nos.
8.	Budding & Grafting Knives	10 nos.
9.	Secateur	10 nos.
10.	Forceps	05 nos.
11.	Buckets	10 nos.
12.	Edge Cutter	02 nos.
13.	Tree Pruner	02 nos.
	Farm Structures	
14.	Green House	01 no.
15.	Poly House	01 no.
16.	Misting Unit	01 no.
	Farm Equipment	
17	Power Triller with Bowing Attachment	01 no.
18	Wheel Barrow	01 no.

19	Hand Sprayer (Small)	05 nos.
20	Foot Sprayer	02 nos.
21	Hand Gloves	20 nos.
22	Balance	01 no.
23	Sieve / Stainer	02 nos.
24	Grass Mower	01 no.
25	Laboratory Equipment Refrigerator	01 no.
26	Glass Wares Beakers	05 nos.
27	Measuring Cylinder	05 nos.
28	Chemicals Growth regulators : G.A.	01 bottle
29	N.A.A.	01 bottle
30	I.A.A.	01 bottle
31	I.B.A.	01 bottle
32	Routine Hormone	01 bottle
33	Identification Materials Flower Germ Plasm	As required
34	Seed material	As required
35	Packing materials	As required
36	Accessories for flower arrangement Different types of flower containers	As required
37	Flower vases	As required
38	Pin holder	As required
39	Laboratory Misc. Supplies Duster	20 nos
40	Soap	20 nos.
41	Cotton balls	10 nos.
42	Filter paper (Packs)	10 nos.
43	Filter cloth	10 mtrs.
44	Compact Disc Educational CD	01 no.
45	Manual Extractor/4 Frame Radial Extractor	1 no
46	50 Kg / 100 kg Honey Tank with Filter - Stainless Steel	1 no.
47	Uncapping Tray	1 no.
48	Cold Uncapping Knife (Left)- Scalloped Edge - Stainless Steel/Cold Uncapping Knife (Right)- Stainless Steel	5 nos
49	Honey Processor	1 set
50	Tap Strainer - Stainless Steel	2 nos,

51	Bee Box ISI A-Type (8 frame)	2 nos.
52	Plunger Marking Cage, Press in Marking Cage, Clip Type Queen Cage, Queen Travelling and Introduction Cages	1 no
53	Combined Veil and smoker	1 no each
54	Pair of Leather Gloves	3 nos
55	Contact Feeder, 4 liter capacity	10 nos
56	Lightweight J-type Hive Tool	10 nos
57	Queen Gate	20 nos
58	Queen Excluder	3 nos
59	Drone Trap	3 nos
60	Fahrenheit Thermometer	02 nos.
61	Steel container	03 nos
62	Stove (Kerosene / Gas)	01 no.

Consumable Tools

Sl. No.	Description of Item	Quantity
1	Miscellaneous Farm Supplies Earthen Pots	100 nos.
2	Plastic Pots	100 nos.
3	Polythene Bags	500 nos.
4	Seed Packets	1000 nos
5	Brown paper bags	1000 nos.
6	Gunny bags	10 nos.
7	Tags-labels	100 nos
8	Thread balls	12 nos.
9	Budding-tape	10 nos.
10	Sirki	10 nos.
11	Bamboos	20 nos.
12	Boxes (Packing)	10 nos.
13	Sutli	05 kgs.
14	Moss-grass	05 kgs
15	Polythene roll	01 no.
16	Tags-label (Metallic)	100 nos.
17	Tray	10 nos

Meteorological Instruments

Sl. No.	**Description of Item**	**Quantity**
1	Raingauge	1 Nos
2	Max-Min Thermometer	1 Nos
3	Dry & Wet Bulb Thermometer with chart	1 Nos