GOVERNMENT OF INDIA
MINISTRY OF SKILL DEVELOPMENT & ENTREPRENEURSHIP
DIRECTORATE GENERAL OF TRAINING

COMPETENCY BASED CURRICULUM

HORTICULTURE

(Duration: One Year)
Revised in July 2022

CRAFTSMEN TRAINING SCHEME (CTS)

NSQF LEVEL- 3

SECTOR – AGRICULTURE

Directorate General of Training

HORTICULTURE

(Non-Engineering Trade)

(Revised in July 2022)

Version: 2.0

CRAFTSMEN TRAINING SCHEME (CTS)

NSQF LEVEL- 3

Developed By

Ministry of Skill Development and Entrepreneurship

Directorate General of Training

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1. COURSE INFORMATION

During the one-year duration of 'Horticulture' trade a candidate is trained on professional skill, professional knowledge and Employability skill related to job role. In addition to this a candidate is entrusted to undertake project work, extracurricular activities and on job training to build up confidence. The broad components covered under Professional Skill subject are as below:-

During the one-year duration the trainee learns about agro-meteorology, importance of different elements of weather & climate of agriculture, farm power and machinery, types and application of farm power, farm electricity, agricultural implements, basic knowledge on plant biology, Renewable energy, Soil properties, concept of formation of soil moisture and its conservation, role of organic matter in soil and its recycling water and their management, Soil fertility, fertilizers, manures & management of soil fertility and productivity, Introductory horticulture, fundamentals of horticultures, Importance and scope of horticulture, classification of horticultural plants etc. The trainee learns about importance of fruits, flowers and vegetables, distribution of area production and productivity of fruits, vegetables and flowers, present situation and scope of development of horticultural crops, schemes on horticultural development, layout of plots and gardens, planning for home gardens, landscape gardens, experimental designs, fruit culture, vegetable propagation, cultivation of fruits& vegetables and its preservation, management of orchards, present situation of cultivation of different fruits, Vegetative propagation, different methods of vegetative propagation of fruits and flowers. cultivation of vegetables & spices, present situation in the cultivation of different vegetable crops, cultivation of flowers, climbers, foliages & other crops, cultivation of mushroom, care and management of potted plants, pest management, classes of insect pests diseases, integrated pest management, Seed production, marketing & trade management, quality of seeds and classification of seeds, Inventory control & maintenance of records, markets and marketing, trade and trading, methods of management of store, types of market, export of products etc.

2. TRAINING SYSTEM

2.1 GENERAL

The Directorate General of Training (DGT) under Ministry of Skill Development & Entrepreneurship offers a range of vocational training courses catering to the need of different sectors of economy/ Labour market. The vocational training programmes are delivered under the aegis of Directorate General of Training (DGT). Craftsman Training Scheme (CTS) with variants and Apprenticeship Training Scheme (ATS) are two pioneer schemes of DGT for strengthening vocational training.

'Horticulture'trade under CTS is one of the popular courses delivered nationwide through network of ITIs. The course is of one-year duration. It mainly consists of Domain area and Core area. The Domain area (Trade Theory & Practical) imparts professional skills and knowledge, while Core area (Employability Skills) imparts requisite core skill & knowledge and life skills. After passing out the training program, the trainee is awarded National Trade Certificate (NTC) by DGT which is recognized worldwide.

Candidates need broadly to demonstrate that they are able to:

- Read and interpret technical parameters/ documents, plan and organize work processes, identify necessary materials and tools;
- Perform task with due consideration to safety rules, accident prevention regulations and environmental protection stipulations;
- Apply professional skill, knowledge & employability skills while performing jobs.
- Document the technical parameters related to the task undertaken.

2.2 PROGRESSION PATHWAYS

- Can join as Horticultural consultants, Horticultural technician, Plant Care Worker, Nursery Staffer, Pest Management, Horticultural Inspector, Gardener, General, Nurseryman, Planter.
- Can become Entrepreneur in the related field.
- Can join Apprenticeship programme in different types of industries leading to National Apprenticeship certificate (NAC).
- Can join Advanced Diploma (Vocational) courses under DGT as applicable.

2.3 COURSE STRUCTURE

Table below depicts the distribution of training hours across various course elements during a period of one year: -

S No.	Course Element	Notional Training Hours
1	Professional Skill (Trade Practical)	840
2	Professional Knowledge (Trade Theory)	240
3	Employability Skills	120
	Total	**1200**

In addition, every year 150 hours of mandatory on the job training (OJT) in the industry, if nearby industry is not available then group project will be mandatory.

On the Job Training (OJT)/ Group Project	150

Trainees of one-year or two-year trade can also opt for optional courses of up to 240 hours in each year for 10th/ 12th class certificate along with ITI certification or add on short term courses.

2.4 ASSESSMENT & CERTIFICATION

The trainee will be tested for his skill, knowledge and attitude during the period of course through formative assessment and at the end of the training programme through summative assessment as notified by the DGT from time to time.

a) The **Continuous Assessment** (Internal) during the period of training will be done by **Formative Assessment Method** by testing for assessment criteria listed against learning outcomes. The training institute has to maintain an individual trainee portfolio as detailed in assessment guideline. The marks of internal assessment will be as per the formative assessment template provided on www.bharatskills.gov.in.

b) The final assessment will be in the form of summative assessment method. The All India Trade Test for awarding NTC will be conducted by **Controller of examinations, DGT** as per the guidelines. The pattern and marking structure are being notified DGTfrom time to time. **The learning outcome and assessment criteria will be the basis for setting question papers for final assessment. The examiner during final examination will also check** the individual

trainee's profile as detailed in assessment guideline before giving marks for practical examination.

2.4.1 PASS REGULATION

For the purposes of determining the overall result, weightage of 100% is applied for six months and one-year duration courses and 50% weightage is applied to each examination for two years courses. The minimum pass percent for Trade Practical and Formative assessment is 60% & for all other subjects is 33%.

2.4.2 ASSESSMENT GUIDELINE

Appropriate arrangements should be made to ensure that there will be no artificial barriers to assessment. The nature of special needs should be taken into account while undertaking the assessment. Due consideration should be given while assessing for teamwork, avoidance/reduction of scrap/wastage and disposal of scrap/waste as per procedure, behavioral attitude, sensitivity to the environment and regularity in training. The sensitivity towards OSHE and self-learning attitude are to be considered while assessing competency.

Assessment will be evidence based comprising some of the following:

- Job carried out in labs/workshop
- Record book/ daily diary
- Answer sheet of assessment
- Viva-voce
- Progress chart
- Attendance and punctuality
- Assignment
- Project work
- Computer based multiple choice question examination
- Practical Examination

Evidences and records of internal (Formative) assessments are to be preserved until forthcoming examination for audit and verification by examining body. The following marking pattern to be adopted for formative assessment:

Performance Level	Evidence
(a) Marks in the range of 60%-75% to be allotted during assessment	

For performance in this grade, the candidate should produce work which demonstrates attainment of an acceptable standard of craftsmanship with occasional guidance, and due regard for safety procedures and practices	• Demonstration of good skills and accuracy in the field of work/ assignments. • A fairly good level of neatness and consistency to accomplish job activities. • Occasional support in completing the task/ job.
(b) Marks in the range of 75%-90% to be allotted during assessment	
For this grade, a candidate should produce work which demonstrates attainment of a reasonable standard of craftsmanship, with little guidance, and regard for safety procedures and practices	• Good skill levels and accuracy in the field of work/ assignments. • A good level of neatness and consistency to accomplish job activities. • Little support in completing the task/job.
(c) Marks in the range of more than 90% to be allotted during assessment	
For performance in this grade, the candidate, with minimal or no support in organization and execution and with due regard for safety procedures and practices, has produced work which demonstrates attainment of a high standard of craftsmanship.	• High skill levels and accuracy in the field of work/ assignments. • A high level of neatness and consistency to accomplish job activities. • Minimal or no support in completing the task/ job.

3. JOB ROLE

Gardener, General; (Mali General) grows flowers, trees, shrubs, seedlings, vegetables, etc. in public or private gardens. Prepares soil and sows seeds, plants, seedlings etc. Waters seed-beds and growing plants. Weeds and hoes garden and prunes hedges and bushes. Sprays and dusts pesticides and evolves other measures to protect plants from diseases and wild animals. Prepares soil and lays lawn. Waters mows and levels lawns. Prepares paths and ensures their proper up-keep. Collects and preserves seeds for sowing. Supervises labourers engaged for assistance. Keeps implements etc. in good working order. May maintain green house for display. May cultivate vegetables and fruit trees. May specialize in ornamental gardening. May work in nursery for improving variety of plants from seeds, cuttings, grafting or budding and be designated as MALI, NURSERY. May sell plants, buy seeds, fertilizers, insecticides, etc. May pay wages to labourers employed.

Nurseryman; Mali, Nursery manages nursery on own account, or on behalf of employer to grow trees, plants, flowers, shrubs, creepers, seeds, bulbs etc. in open air or green houses for sale to customers. Decides kind and number of plants to be grown and method of planting, cultivating and treatment based on soil, climatic conditions, irrigation facilities etc. Selects and purchases seeds, fertilizers, insecticide. Equipment and machinery and other items. Plans preparation of beds and method of planting, depending on type of plants to be grown. Prepares bed by various processes such as breaking soil, mixing fertilizers, etc. sows seeds, plants, seedlings, cuttings or propagates plants by grafting, budding and other methods and makes water channels. Watches growth of sapling, seedlings, grafts and plants. Hoes and prunes excess growth and off-shoots of plants, dusts and sprays pesticides and takes other measures to protect plants from pets, wild animals, etc. Observes development of plants. Develops methods of grafting and budding./ Collects and preserves seeds for sale. Hires labour if necessary and undertakes planting, weeding, pruning etc. as required. Supervises their work and trains them. Maintains buildings and equipment in good condition. Keeps records of cost and production statement. Sells seedling, seeds, bulbs etc. May specialize in landscape planting.

Planter; manages plantation on own account to grow plantation crops such as tea, coffee, rubber, etc. Arranges to procure seed according to type of crop such as tea, coffee, rubber, etc. Determines kinds of crop to be grown. Gets land cleared and prepared for growing crops by digging, ploughing, harrowing etc. Organizes and supervises various farm operations, sowing, manuring, weeding, spraying insecticide, and protection of crop from destruction by wild animals. Arranges harvesting of crop and supervises plucking, tapping and threshing of leaves, etc. Ensures proper maintenance and development of plantation estate. Maintains records relating to cost of production, sale and other accounts. May conduct research and organize demonstration. May arrange preservation of produce and partially process them prior to

marketing. Is designated as Planter, Tea; Planter, Coffee; Planter, Cinchona; Planter, Cocoa; Planter, Rubber according to type of crop grown.

Reference NCO-2015:

(i) 6113.0301 – Gardener, General
(ii) 6113.0200 – Nurseryman
(iii) 6113.0100 – Planter

Reference NOS: AGR/N0414, AGR/N 0415, AGR/N 0401, AGR/N 0404, AGR/N 0417, AGR/N 0418 AGR/N, AGR/N 0419, AGR/N 0403, AGR/N 0347, AGR/N 0309, AGR/N 0349, AGR/N 9417, AGR/N 9418, AGR/N 9419, AGR/N 9420, AGR/N 9908, AGR/N 0803, AGR/N 0843, AGR/N 0801, AGR/N 0718, AGR/N 0702, AGR/N 7814, AGR/N 7815, AGR/N 7103, AGR/N 7104,

4. GENERAL INFORMATION

Name of the Trade	**HORTICULTURE**
Trade Code	DGT/1063
NCO - 2015	6113.0301, 6113.0200, 6113.0100
NOS Covered	AGR/N0414, AGR/N 0415, AGR/N 0401, AGR/N 0404, AGR/N 0417, AGR/N 0418 AGR/N, AGR/N 0419, AGR/N 0403, AGR/N 0347, AGR/N 0309, AGR/N 0349, AGR/N 9417, AGR/N 9418, AGR/N 9419, AGR/N 9420, AGR/N 9908, AGR/N 0803, AGR/N 0843, AGR/N 0801, AGR/N 0718, AGR/N 0702, AGR/N 7814, AGR/N 7815, AGR/N 7103, AGR/N 7104,
NSQF Level	Level-3
Duration of Craftsmen Training	One Year (1200 Hours + 150 Hours OJT/Group Project)
Entry Qualification	Passed class 10th examination
Minimum Age	14 years as on first day of academic session.
Eligibility for PwD	LD,CP,LC,DW,AA,LV,DEAF,HH,AUTISM,ID,SLD
Unit Strength (No. of Student)	24 (There is no separate provision of supernumerary seats)
Space Norms	1000 Sq. m
Power Norms	2 KW
Instructors Qualification for:	
(i) Horticulture Trade	B.Voc/B.E/B. Tech in Agriculture/Horticulture from AICTE/UGC recognized university with one-year experience in the relevant field. **OR** B.Sc (Agriculture/Horticulture)from UGC recognised university with two years' experience in the relevant field. **OR** Advanced Post Graduate Diploma (Minimum 2 years) in Horticulture/ Agriculture from recognized board of education or relevant Advanced Diploma (Vocational) from DGT with two years' experience in the relevant filed. **OR** NTC/NAC passed in the trade of "Horticulture" or "Floriculture and Landscaping"with three years' experience in the relevant field.

	<u>Essential Qualification</u>: Relevant Regular / RPL variants of National Craft Instructor Certificate (NCIC) under DGT. ***Note:-Out of two Instructors required for the unit of 2(1+1), one must have Degree/Diploma and other must have NTC/NAC qualifications. However,both of them must possess NCIC in any of its variants.***
(ii) Employability Skill	MBA/ BBA / Any Graduate/ Diploma in any discipline with Two years' experience with short term ToT Course in Employability Skills. (Must have studied English/ Communication Skills and Basic Computer at 12th / Diploma level and above) **OR** Existing Social Studies Instructors in ITIs with short term ToT Course in Employability.
(iii) Minimum Age for Instructor	21 Years

5. LEARNING OUTCOME

Learning outcomes are a reflection of total competencies of a trainee and assessment will be carried out as per the assessment criteria.

5.1 LEARNING OUTCOMES

1. Identify metrological instruments and the diversity within the profession of horticulture following safety precautions.(NOS:AGR/N0414, AGR/N0347)
2. Plan and prepare life cycles of plants, scope of horticulture and introduction to fruits, flowers & vegetables. (NOS:AGR/N0414, AGR/N0347)
3. Classify fruits and vegetables based on season and edible parts. (NOS:AGR/N0414, AGR/N0347)
4. Install agro-meteorology instruments, analyze metrological data and record the data.(NOS:AGR/N9417)
5. Identify, select and maintain different farm power machinery. (NOS:AGR/N0415)
6. Measure physical and chemical properties of soil, soil pH, different methods and ingredient use for correction of Acid soil. (NOS:AGR/N0401)
7. Plan, install and use different irrigation systems, Water lifting systems and water quality assessment systems. (NOS:AGR/N0404, AGR/N0309)
8. Identify different types of soil, methods of soil sampling and collection, study on soil physical characters, Interpret soil test reports and different soil correction methods. (NOS:AGR/N0401)
9. Analyze Soil water holding capacity, Different methods and ingredients used for correction of Saline soil. Field visit for identification of soil problems. (NOS:AGR/N9418)
10. Plan and execute different soil correction method through drainage and agronomic practices. (NOS:AGR/N0401)
11. Measure soil fertility and apply soil fertility management for improvement of fertility of soil. (NOS:AGR/N0401)
12. Apply Integrated Nutrient Management System (INMS) in the field. (NOS:AGR/N0401)
13. Identify, prepare and apply Bio-fertilizers. (NOS:AGR/N0401)
14. Identify the role of major and minor plant nutrients and its deficiency symptoms. (NOS:AGR/N0401)
15. Produce different types of fruits, vegetables and flowers as per the requirements. (NOS:AGR/N9419)

16. Apply various cultivation techniques & methods to fruit crops & vegetable farms. (NOS:AGR/N0349)
17. Plan and execute different garden layouts and designs. (NOS:AGR/N0803,AGR/N0843)
18. Identify and select different Vegetative propagation method & use of plant hormones. (NOS:AGR/N0801)
19. Apply propagation techniques viz cutting, grafting, budding and layering. (NOS:AGR/N0801)
20. Process and preserve vegetables and fruits using different techniques to prepare jam, jelly, squash, sauce, pickle, ketchup etc. its preservation and storage. (NOS:AGR/N9420)
21. Develop the Cultivation techniques of different vegetables and spice crops. (NOS:AGR/N0417,AGR/N0418,AGR/N0419)
22. Perform Floriculture and cultivation techniques for different Flowers, Climbers, Foliages and Medicinal plants to decorate.(NOS:AGR/N0718,AGR/N0702)
23. Perform Cultivation of Betel Vine and Mushroom farming.(AGR/N7814,AGR/N07815)
24. Apply Pest Management and control the Pest and Diseases of Horticultural Crops.(NOS:AGR/N0403)
25. Use techniques of Seed Production, Processing and Packaging.(NOS:AGR/N7103,AGR/N7104)
26. Maintain the records viz. Inventory Control, Maintenance of Records and Store management. (NOS:AGR/N9908)
27. Conduct Market Survey and follow the legal requirement for trading as part of entrepreneurship development. (NOS:AGR/N9908)

6. ASSESSMENT CRITERIA

LEARNING OUTCOMES	ASSESSMENT CRITERIA
1. Identify metrological instruments and the diversity within the profession of horticulture following safety precautions. (NOS:AGR/N0414, AGR/N0347)	Importance of different elements of weather and climate in agriculture.
	Knowledge on different agro-climatic regions of the country.
	Knowledge on crops grown relating to seasonal pattern, its field preparation methods, sowing and harvest.
	Identify different meteorological instruments and its use.
	Observe the different meteorological data and draw sketches.
	Knowledge on fundamentals of horticulture.
	Identification of plants based on botanical classification.
	List-out common names and botanical names.
	Describe the commercial importance of horticulture plants.
2. Plan and prepare life cycles of plants, scope of horticulture and introduction to fruits, flowers & vegetables. (NOS:AGR/N0414,AGR/N0347)	Knowledge on classification of horticultural plants.
	Knowledge on fruits, flowers and vegetables.
	Illustrate the life cycles of selected plants through sketches and diagram.
	List out common fruits and vegetables in the country according to agro-ecological situation.
3. Classify fruits and vegetables based on season and edible parts. (NOS:AGR/N0414, AGR/N0347)	Knowledge on classification of fruits and vegetables based on season and edible parts.
	Identify fruits on the basis of shape, color, aroma etc.
	Identify fruits and vegetables through field study.
4. Install agro-meteorology instruments, analyze metrological data and record the data. (NOS:AGR/N9417)	Knowledge on different special weather phenomena and hazard weather events.
	Knowledge on the effect of natural disasters on crops and crop management.
	Install meteorological instruments.
	Knowledge of weather forecasting and its implication.
	Analyze different meteorological data.
	Knowledge on metric system of area and weights.

	Calculate weight and measures.
	Convert units of weights, acres to hectares.
	Knowledge on land records, cadastral map, measurement of plots.
	Perform the use of electrical balance for measuring milligram fractions of chemicals.
5. Identify, select and maintain different farm power machinery. (NOS:AGR/N0415)	Knowledge on Farm power machinery.
	Knowledge on different agricultural implements, harvesting and post-harvestequipments.
	Identify different farm implements.
	Demonstrate ploughing, harrowing and laddering.
	Demonstrate the handling and care of seed drill, wheel hoe, sprayer, duster, pedal thresher.
	Calibrate and fix seed drill, wheel hoe, paddyweeder, MB plough.
	Demonstrate the operation of pump set.
	Identify parts of farm implements and draw sketches.
	Knowledge on farm power, farm electricity and electrical power-driven machineries like motors.
	Knowledge on renewable sources of energy devices.
	Use of tractor, power tillers and rotavator.
	Identify different plant parts and demonstrate germination.
6. Measure physical and chemical properties of soil, soil pH, different methods and ingredient use for correction of Acid soil. (NOS:AGR/N0401)	Knowledge on soil properties and its formation.
	Knowledge on different soil management practices like soil moisture conservation technique, soil erosion control and soil conservation.
	Knowledge on properties of water and water conservation.
	Methods of water harvesting.
	Identify watershed resources and drawing of watershed maps.
	Knowledge on aquifer and aquifer recharging technique.
	Knowledge on chemical properties of soil.
	List out different methods for correction of acid soil.
	Execute measurement of soil pH by litmus method and

	electronic pH meter.
	Determine the rate of application of lime, sludge, wood ash, dolomite, basic slag and rock phosphate for correction of acid soil.
7. Plan, install and use different irrigation systems, Water lifting systems and water quality assessment systems. (NOS:AGR/N0404) (NOS:AGR/N0309)	Knowledge on irrigation.
	Concept on different type and methods of irrigation.
	Methods of water lifting.
	Knowledge on water quality.
	Install different irrigation systems.
	Methods for control of water loss.
	Knowledge on drainage, its type and control technique.
8. Identify different types of soil, methods of soil sampling and collection, study on soil physical characters, Interpret soil test reports and different soil correction methods. (NOS:AGR/N0401)	Knowledge on physical soil properties like soil texture, porosity, bulk density, particle density.
	Knowledge on soil structure, water holding capacity, pH, EC, CEC, soil solution.
	Identify soil by its texture.
	Demonstrate soil sampling method, collection of soil, and procedure for sending to soil testing laboratory.
	Analyze and interpret soil and fertilizer testing report.
	Knowledge different soil correction methods.
9. Analyze Soil water holding capacity, Different methods and ingredients used for correction of Saline soil. Field visit for identification of soil problems. (NOS:AGR/N9418)	Determine soil water holding capacity.
	Knowledge on correction of saline soil.
	List out different methods for correction of saline soil.
	Methods of cultivating salt tolerant crops.
	Select saline, acid soil and identify the problem.
10. Plan and execute different soil correction method through drainage and agronomic practices. (NOS:AGR/N0401)	Knowledge on correction methods of Alkaline soil.
	Determine the rate of application of Sulphur and Gypsum for correction of alkaline soil.
	Knowledge on soil organic matter.
	Knowledge on the effect of organic matter on soil properties, soil microbes, soil fertility and C/N ratio of soil
	Methods of recycling of organic matter.
	Identification of Azolla, BGA, its method of collection and

	multiplication.
11. Measure soil fertility and apply soil fertility management for improvement of fertility of soil. (NOS:AGR/N0401)	Knowledge on soil fertility and soil fertility management.
	Knowledge on fertilizer and organic manures.
	List out different methods of composting
	Differentiate between FYM, sludge, poultry manure, vermin compost and NADEP compost.
	Execute the process of vermin compost and NADEP compost
	Evaluate the nutrient content of FYM, sludge, poultry manure, vermin compost and NADEP compost.
	Describe the role of different organic matter on improving soil quality.
12. Apply Integrated Nutrient Management System (INMS) in the field. (NOS:AGR/N0401	Knowledge on Integrated Nutrient Management System (INMS).
	Knowledge on green manure crops, its cultivation and package of practice.
	Identify seeds of different green manure crops.
	Identify different green manure crops.
	List out different green manure crops.
	Demonstrate and describe the methods of incorporation of green manure crops for improving soil fertility.
13. Identify, prepare and apply Bio-fertilizers. (NOS:AGR/N0401)	Knowledge on bio-fertilizer, its concept and classification.
	Identify different biofertilizers.
	Prepare different biofertilizers.
	Demonstrate field application technique of biofertilizers.
	Describe the use of different biofertilizers like Azotobacter sp., Phosphate and Potash solubilizing bacteria and Rhizobium sp.
	Knowledge on mycorrhiza, its availability, propagation and field application.
14. Identify the role of major and minor plant nutrients and its deficiency symptoms. (NOS:AGR/N0401)	Knowledge on major and minor plant nutrient elements.
	List out major and minor plant nutrients and their role.
	Identify fertilizer and micronutrient containing chemicals.
	Identify deficiency symptoms of nutrient elements.

	Knowledge on the practice of different methods of micro-nutrients application.
	Knowledge on chemical fertilizers.
	List out different chemical fertilizers.
	Calculate different chemical fertilizer doses for field application.
	Determine the time for fertilizer application.
15. Produce different types of fruits, vegetables and flowers as per the requirements. (NOS:AGR/N9419)	Knowledge on present situation and scope of horticultural development.
	Knowledge on different schemes in horticulture.
	Identify the distribution area, productivity of different fruits, vegetables and flowers.
	Illustrate the importance of fruits and vegetables as protective food.
	List out the nutritional composition and value of fruits and vegetables.
	Knowledge on daily requirement of fruits and vegetables per person
16. Apply various cultivation techniques & methods to fruit crops & vegetable farms. (NOS:AGR/N0349)	Knowledge on cultivation technique of different fruit crops.
	Knowledge on management of orchards.
	Demonstrate preparation of seed beds, sowing of seeds, seed treatment, transplanting and watering and its management.
	Depict protection measures against adverse environment.
	Knowledge on selection of planting materials, varieties, time of planting, spacing, manures and fertilizers and intercultural operation.
	Knowledge on harvesting time, grading and storage.
	Calculate crop yield.
	Demonstrate all necessary steps required for preparation of individual and group plots.
17. Plan and execute different garden layouts and designs. (NOS:AGR/N0803,AGR/N0843)	Knowledge on making layouts and design for different plots.
	Knowledge on roof top gardening.

	Plan and execute home garden, roof top garden, individual instructional plots and field experimental design.
	Plan and execute plant nursery.
	Design and execute landscape garden.
18. Identify and select different Vegetative propagation method & use of plant hormones. (NOS:AGR/N0801)	Knowledge on vegetative propagation of fruits and flowers.
	Demonstrate different vegetative propagation techniques.
	Knowledge on the role of plant hormones.
	Demonstrate the role of plant hormones on vegetative propagation and crop production.
19. Apply propagation techniques viz cutting, grafting, budding and layering. (NOS:AGR/N0801)	Knowledge on methods of cutting, grafting, budding and Layering
	List out different techniques of grafting, budding and layering.
	Demonstrate different methods of grafting, budding and Layering.
	Illustrate chip budding and T –budding with diagram.
20. Process and preserve vegetables and fruits using different techniques to prepare jam, jelly, squash, sauce, pickle, ketchup etc. its preservation and storage. (NOS:AGR/N9420)	Depict the methods of fruits and vegetable preservation.
	Describe the importance of preservation.
	Demonstrate the steps like grading, washing, peeling and dehydration of fruits and vegetable by electrical and solar power.
	Demonstrate processing instruments and draw sketches.
	Demonstrate the preparation of squash, jam, jelly, sauce & Pickles.
	Knowledge on use of preservatives.
	Illustrate the storing method of the processed materials.
	Knowledge on maintenance of processed food standard and quality.
21. Develop the Cultivation techniques of different vegetables and spice crops.	Knowledge on cultivation of vegetables and spices.
	Identify good planting materials and variety (OP and F1 Hybrid)

(NOS:AGR/N0417, AGR/N0418,AGR/N0419)	Illustrate selection of suitable climate and planting time.
	Demonstrate package of practice of different vegetables and spices like preparation of seed bed, transplanting, spacing for planting, dose of fertilizers and manures, intercultural operations, INMS, harvesting, grading, storage, transportation and marketing.
	Demonstrate rising of individual and community plots of Vegetables and spices.
22. Perform Floriculture and cultivation techniquesfor different Flowers, Climbers, Foliages and Medicinal plants to decorate. (NOS:AGR/N0718,AGR/N0702)	Knowledge on floriculture.
	Identify different flowers, climbers and foliages.
	Illustrate the package of practice of different flowers, climbers and foliages like selection of clone, cutting, budding, grafting, layering, preparation of seed bed, transplanting, spacing for planting, dose of fertilizers and manures, intercultural operations, INMS, harvesting, grading, storage, transportation and marketing.
	Identify different medicinal plants.
	Illustrate the package of practice of different medicinal plants like selection of clone, cutting, layering, preparation of seed bed, transplanting, spacing for planting, dose of fertilizers and manures, intercultural operations, INMS, harvesting, grading, storage, transportation and marketing.
	Demonstrate care and management of potted plants.
	Knowledge on rising of individual, community and museum plots of flower.
	Identify suitable variety, planting material and planting time.
	Demonstrate plot preparation technique.
	Demonstrate intercultural operations and plant protection measures.
	Knowledge on harvesting, sorting, packaging and marketing.
23. Perform Cultivation of Betel Vine and Mushroom farming. (AGR/N7814,AGR/N7815)	Illustrate package of practice of beetle vine, disease and pest protection measures.
	Design and construct Beetle vineyard.

	Demonstrate propagation of beetle vine.
	Illustrate package of practice of mushroom cultivation and disease prevention measures.
	Design and construct mushroom shade.
	List out different edible mushroom varieties.
	Knowledge on harvesting, sorting, packaging and marketing of beetle vine and mushroom.
24. Apply Pest Management and control the Pest and Diseases of Horticultural Crops. (NOS:AGR/N0403)	Knowledge on pest management and Integrated pest management, classification of insect, pest and diseases.
	Knowledge on bio-control agents and bio-pesticides.
	Identify major insect pest and diseases.
	Identify different classes of synthetic and bio –pesticides.
	Demonstrate preparation of spray solution, dusts and its application procedure.
	Demonstrate preparation of Bordeaux mixture and its application.
	Illustrate systemic waste disposal methods to prevent environmental pollution.
25. Use techniques of Seed Production, Processing and Packaging. (NOS:AGR/N7103,AGR/N7104)	Knowledge on seed production technology.
	Determine quality of seeds.
	Differentiate between breeder seeds, foundation seeds, certified seeds and TL seeds.
	Demonstrate package of practices for seed production and processing of seeds.
	Illustrate the packaging requirement of seeds and modern seed packaging techniques.
	Knowledge on seed marketing, trade management and seed Act.
26. Maintain the records viz. Inventory Control, Maintenance of Records and Store management. (NOS:AGR/N9908)	Knowledge on inventory control and maintenance of records.
	Demonstrate methods of store management.
	Perform stocking, issuing and stock verification.
	Perform maintenance of farm records.
27. Conduct Market Survey and follow	Classify market types.

the legal requirement for trading as part of entrepreneurship development. (NOS:AGR/N9908)	Perform market study.
	Demonstrate market survey techniques.
	Execute tabulation and interpretation of data.
	Depict trade, trading requirements and assess trade problems.
	Knowledge on licensing, registration, sales tax, other taxes, pricing of products.
	Visit trade centers and export houses.
	Knowledge on export of products.
	Knowledge on entrepreneurship.
	Execute workshop and group discussion programme.
	Execute field survey and project preparation.

SYLLABUS FOR HORTICULTURE TRADE			
DURATION: ONE YEAR			
Duration	**Reference Learning outcome**	**Professional Skills (Trade Practical) With Indicative Hours**	**Professional Knowledge (Trade Theory)**
Professional Skill 45 Hrs; Professional Knowledge 12Hrs	Identify metrological instruments and the diversity within the profession of horticulture following safety precautions. (NOS:AGR/N0414, AGR/N0347)	1. Agro-meteorology - Identification of meteorological instruments. (07 hrs.) 2. Making sketches with problems of recording of (06 hrs) (i) Rainfall, (ii) Temperature, (iii) Humidity, (iv) Wind direction and speed, Evaporation and (v) Sunshine hours (vi) Agro climatic regions (10 hrs.)	Importance of different elements of weather and climate in agriculture – rainfall, temperature, humidity, sunshine, wind speed and direction. 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. discipline and outward Signs. (06 hrs.)
		3. Introductory Horticulture. (02 hrs.) 4. Fundamentals of Horticulture. (04 hrs.) 5. Identification of plants according to botanical classifications. (08 hrs.) 6. Commercial importance. Common names, botanical names. (08 hrs.)	Introduction on Horticulture. Classification of the subject. Importance of horticulture. (06 hrs.)
Professional Skill 20Hrs;	Plan and prepare life cycles of plants, scope of	7. Making sketches and diagrams. Studying the life cycles of some selected	Scope of horticulture. Classification of horticultural plants.

Professional Knowledge 06Hrs	horticulture and introduction to fruits, flowers & vegetables. (NOS:AGR/N0414, AGR/N0347)	plants of each class. (18 hrs.) 8. Introduction to fruits, flowers and vegetables. (02 hrs.)	Common fruits, flowers and vegetables grown in the country according to agro-ecological situation and season (06 hrs.)
Professional Skill 20Hrs; Professional Knowledge 06Hrs	Classify fruits and vegetables based on season and edible parts. (NOS:AGR/N0414, AGR/N0347)	9. Identification of fruits – study of size, shape, colour, aroma etc. (10 hrs.) 10. Identification of fruits and vegetables through field study. (10 hrs.)	Classification of vegetables based on season and edible parts. (06 hrs.)
Professional Skill 45 Hrs; Professional Knowledge 12Hrs	Install agro-meteorology instruments, analyze metrological data and record the data. (NOS:AGR/N9417)	11. Installation of the above six instruments. (10 hrs) 12. Recording meteorological data. Visit to agro-meteorological Stations. (08 hrs) Weights and measures and land records – (06 hrs.) 13. Calculations on weights and measures. Study of land records. (05 hrs.) 14. Cadastral map, identification of plot and its measurement. (08 hrs.) 15. Practice & use of electrical Top-pan Balance for measuring milligram fractions of chemicals. (08 hrs.)	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. Weights and measures: Concept of Metric System of area and weights, Conversion of units of acres to hectares. Brief idea about land records, Cadastral map, identification of plot and its measurement. (12 hrs.)
Professional Skill 45 Hrs; Professional Knowledge 12Hrs	Identify, select and maintain different farm power machinery. (NOS:AGR/N0415)	16. Farm Machinery - Practices in ploughing, harrowing, laddering, (05 hrs.) 17. Use and care of seed drill, wheel hoe, handling of	Agricultural implements: Countryplough, MB plough, Bidhe, Wheel hoe, Paddy weeder, seed drill, pedal thresher, duster and sprayer, Harvesting and post

		sprayer, duster and pedal thresher. (04 hrs) 18. Calibration and fitting, (6hrs) (i) Fixing of seed drill, (ii) Wheel hoe, (iii) Paddy weeder, (iv) MB plough, 19. Operation of pump set.(04 hrs) 20. Making sketches of parts of important farm equipment. (04 hrs) 21. Use of electrical power driven machineries like motors. (04 hrs) 22. Use of alternative and renewable sources of energy devices. (04 hrs) 23. Safety awareness related to the trade-personal, machine/equipment. (04 hrs) 24. Use of farm machineries and its operation like Tractor, power tiller, Rotavator. Cost calculations. (04 hrs) 25. Basic Knowledge on Plant Biology, Study of germination. (04 hrs) (i) Plants parts, (ii) Roots, (iii) Flowers, (iv) Fruits & seeds. 26. Identification of Common (04 hrs)	harvesting equipments. b) Types and application of Farm Power, Farm electricity, renewable energy. c) Identification of different plant parts (12 hrs.)
Professional Skill 20Hrs;	Measure physical and chemical	27. Soils, Water and their Management: Soil - Practice	Soils and its concept of formation Properties Soil

Professional Knowledge 06Hrs	properties of soil, soil pH, different methods and ingredient use for correction of Acid soil. (NOS:AGR/N0401)	- cultural measures of soil moisture & conservation (i) Soil moisture & its conservation - Study of soil water at field capacity, hygroscopic water and water at wilting point. (05 hrs) (ii) Soil erosion and its control - Study of soil erosion and Practice soil erosion, control techniques – contour bunds, trenches, gully control measures. (05 hrs) (iii) Soil conservation - Vegetative measures of water conservation. Visit to water conservation Sites. (05 hrs) (iv) Watershed and water harvesting - Visit to Watershed. Drawing of notional watershed maps. Identifying watershed resources. Study of water table, aquifer, Aquifer recharging techniques.(05 hrs)	moisture and its conservation, Water conservation technique and consumptive use of water Soil erosion – its types, causes, effect, control measures. Low cost soil conservation techniques with vegetation etc. (06 hrs.)
Professional Skill 20Hrs; Professional Knowledge 06Hrs	Plan, install and use different irrigation systems, Water lifting systems and water quality assessment systems. (NOS:AGR/N0404, AGR/N0309)	28. Irrigation and Drainage - (i) Practice different methods of irrigation. Practice water lifting with all available devices. (03 hrs) (ii) Study of quality of irrigation water. (02 hrs) (iii) Study of water conveyance and water	a) Irrigation: Its need, irrigation types, Methods of application, appliances. b) Water lifting equipment – Indigenous and power operated; Assessment of quality and quantity of water. c) Irrigation Water – Conveyance and control

		loss during irrigation. (03 hrs) (iv) Control of water loss by various techniques. (03 hrs) (v) Installation of micro and pressure irrigation systems. (03 hrs) (vi) Practice irrigation through micro and pressure irrigation systems. (03 hrs) (vii) Practice drainage systems. (03 hrs)	technique. d) Loss of irrigation water in different ways. Methods of prevention of such loss. e) Micro Irrigation system – Drip, Sprinkler and other methods. f) Drainage – need, type and control technique. (06 hrs.)
Professional Skill 20Hrs; Professional Knowledge 06Hrs	Identify different types of soil, methods of soil sampling and collection, study on soil physical characters, Interpret soil test reports and different soil correction methods. (NOS:AGR/N0401)	29. Visual identification of textural type of soils. (03 hrs) 30. Collection of soil samples, procedure for sending samples to Soil Testing Laboratory. (04 hrs) 31. Interpretation of soil testing results and fertilizer recommendation. (05 hrs) 32. Practicing different methods of correction of soil acidity, such as: (i) liming, (ii) sludge, (iii) wood ash, (iv) dolomite, (v) basic slag, (vi) Rock phosphate with frequency and rate of application. (05 hrs) 33. Study of soil particles –sand, silt, clay. (03 hrs)	Texture (definition, particle size of soil ingredients i.e. sand, silt, clay) classification and importance. Porosity, bulk density & particle density. Structure (definition, classification, importance), water holding capacity, pH, EC, CEC, Soil solution, Soil classes on the basis ofagro climatic zones. (06 hrs.)
Professional Skill 20Hrs;	Measure physical and chemical	34. Study soil porosity. Study bulk and particle density of	Acid Soils – different methods of correction of soil acidity,

Professional Knowledge 06Hrs	properties of soil, soil pH, different methods and ingredient use for correction of Acid soil. (NOS:AGR/N0401)	soil. (05 hrs) 35. Study soil types based on textural classes. (04 hrs) 36. Study different structures of soil. (05 hrs) 37. Study soil reaction- Measurement of pH by litmus method and using electronics devices. (06 hrs)	such as liming, sludge, wood ash, dolomite, basic slag, rock phosphate - their composition, frequency and rate of application. (06 hrs.)
Professional Skill 20Hrs; Professional Knowledge 06Hrs	Analyze Soil water holding capacity, Different methods and ingredients used for correction of Saline soil. Field visit for identification of soil problems. (NOS:AGR/N9418)	38. Study water holding capacity of soil. (02 hrs) 39. Visit to acid soil and saline soil areas and identification of field problems. (13 hrs) 40. Practice method of correction of acid soil by application of various materials such as lime, (i) Sludge, (ii) Wood ash, (iii) Dolomite, (iv) Basic slag, (v) Rock phosphate. (05 hrs)	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. (06 hrs.)
Professional Skill 20Hrs; Professional Knowledge 06Hrs	Plan and execute different soil correction method through drainage and agronomic practices. (NOS:AGR/N0401)	41. Practicing methods of corrections through improvement of drainage, flushing, leaching and scrapping. (04 hrs) 42. Practicing methods to combat the salinity problems. (04 hrs) 43. Adoption of different agronomic practices such as ridge and furrow methods of sowing and irrigation. (04 hrs) 44. Practice correction methods through application of	Alkaline soils – Correction through application of Sulphur and Gypsum – frequency and rate of application. 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

		Sulphur and Gypsum – frequency and rate of application. (04 hrs) 45. Role of organic matter in soil and its recycling - Collection and use of Azolla, BGA and its multiplication. Study of recycling of organic matter. (04 hrs)	organic matter. (06 hrs.)
Professional Skill 20Hrs; Professional Knowledge 06Hrs	Measure soil fertility and apply soil fertility management for improvement of fertility of soil. (NOS:AGR/N0401)	46. Soil Fertility, Fertilizers, Manures & Soil Fertility Management (07hrs) 47. Practice of Integrated Nutrient. (02 hrs) 48. Organic matter, fertilizers and soil amendments, crop rotation. (05 hrs) 49. Adoption of appropriate cropping systems for maintenance of soil fertility. (06 hrs)	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. g) Depletion of Soil fertility : i) Factors affecting such as leaching, run-off, chemical and biological fixation of nitrogen, de-nitrification, volatilization, crop removal. 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. (06 hrs.)
Professional Skill 20Hrs;	Apply Integrated Nutrient	50. Integrated Nutrient Management System	c) Green manure – Role of Green Manuring in crop

Professional Knowledge 06Hrs	Management System (INMS) in the field. (NOS:AGR/N0401)	(INMS) in the field. (04 hrs) 51. Awareness on occupational health hazards and safety related to the trade. (04 hrs) 52. Identification of seeds of Green Manuring. Crops. (03 hrs) 53. Identification of different Green Manuring crops (03 hrs) (i) Dhaincha, (ii) Kalai, (iii) Cowpea, (iv) Subabul, (v) Glyricidia. 54. Demonstration and incorporation of green manuring crops. (06 hrs)	production. Green manuring, its principles, methods and practices. Different of Green Manure crops. Cultivation of important Green Manuring crops such as Dhaincha, Kalai, Cowpea, Sunhemp, Glyricidia. (06 hrs.)
Professional Skill 45 Hrs; Professional Knowledge 12Hrs	Identify, prepare and apply Bio-fertilizers. (NOS:AGR/N0401)	55. Identification of bio-fertilizers. (10 hrs) 56. Preparation of bio-fertilizers. (15 hrs) 57. Practice of bio-fertilizers, application and techniques. Field diagnostic study for deficiency. (20 hrs)	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. (12 hrs.)
Professional Skill 20Hrs; Professional Knowledge 06Hrs	Identify the role of major and minor plant nutrients and its deficiency symptoms. (NOS:AGR/N0401)	58. Symptoms of nutrient elements. (06 hrs) 59. Identification of fertilizers andMicronutrient containing chemicals. (06 hrs) 60. Practice application of fertilizers and manures by various means. (08 hrs)	e) Essential plant nutrient elements - Role of Major and Minor plant nutrient elements. Deficiency symptoms (06 hrs.)
Professional	Produce different	61. Importance of fruits,	Distribution of area,

Skill 20Hrs; Professional Knowledge 06Hrs	types of fruits, vegetables and flowers as per the requirements. (NOS:AGR/N9419)	flowers and vegetables - Scope of horticultural development (10 hrs) 62. Different schemes in horticulture. (10 hrs)	production and productivity of different fruits, vegetables and flowers. Importance of fruits and vegetables as protective food. Nutritional composition and value of fruits and vegetables. Daily requirement of fruits and vegetables per person. Present situation and scope of development of horticultural crops. Schemes on horticultural development. (06 hrs.)
Professional Skill 45 Hrs; Professional Knowledge 12Hrs	Apply various cultivation techniques & methods to fruit crops & vegetable farms. (NOS:AGR/N0349)	63. Cultivation of fruits, Management of orchards. (08 hrs) 64. Preparation of seed bed, sowing of seeds, seed treatment, watering, transplanting, (10 hrs) 65. Protection against adverse environment. (07 hrs)	Present situation of cultivation of different fruit crops like Mango, Banana, Citrus (Lime and Pumelo), Guava, Litchi, Pineapple, Coconut, Papaya , Ber, Apple, Grapes, Pear, Watermelon etc. (06 hrs.)
		66. Management of seed bed. (05 hrs) 67. Preparation of individual and group plots: (i) Planning, (01 hr) (ii) Making layout, (01 hr) (iii) Planting, (01 hr) (iv) Aftercare. (02 hrs) (v) Digging of pit, (02 hrs) (vi) Enrichment of soil, (02 hrs) (vii) Refilling of pits, (02 hrs) (viii) Planting, (02 hrs) (ix) Watering etc. (02 hrs)	Special emphasis on the impact point – (Climate, Variety, Planting materials, Planting time, Spacing, Manures and fertilizers, Intercultural, Harvesting, Grading, Storage, Marketing, Yield, Economics). (06 hrs.)

Professional Skill 45 Hrs; Professional Knowledge 12Hrs	Plan and execute different garden layouts and designs. (NOS:AGR/N0803, AGR/N0843)	68. Layout of Plots and Gardens - Making plans for (i) Home and Roof Gardens (08 hrs) (ii) Gardens, (08 hrs) (iii) Individual instructional plots, (08 hrs) (iv) Nurseries, (07 hrs) (v) Landscape gardens, (07 hrs) (vi) Experimental designs.(07 hrs)	Planning for home gardens, roof gardens, individual instructional plots, gardens, nurseries, landscape gardens, experimental designs. (12 hrs.)
Professional Skill 20Hrs; Professional Knowledge 06Hrs	Identify and select different Vegetative propagation method & use of plant hormones. (NOS:AGR/N0801)	69. Vegetative Propagation- Study and practice of propagation techniques of different types of plants. (15 hrs) 70. Study of plant hormones.(05 hrs.)	Different methods of vegetative propagation of fruits and flowers. Role of plant hormones in propagation and crop production. (06 hrs.)
Professional Skill 20Hrs; Professional Knowledge 06Hrs	Apply propagation techniques viz cutting, grafting, budding and layering. (NOS:AGR/N0801)	71. Practice of propagation techniques: (i) Cutting, (02 hrs) (ii) Air layering, (03 hrs) (iii) Ground layering, (02 hrs) (iv) Inarch grafting, (02 hrs) (v) Veneer grafting, (03 hrs) (vi) Stone grafting, (02 hrs) (vii) Patch budding, (02 hrs) (viii) Chip budding. (02 hrs) (ix) And T-budding (with diagrams). (02 hrs)	Importance of vegetative Propagation. Types: Cutting, Air layering, Ground layering, Inarch grafting, Veneer grafting, Stone grafting, Patch budding, Chip budding and T-budding (with diagrams). (06 hrs.)
Professional Skill 20Hrs; Professional Knowledge 06Hrs	Process and preserve vegetables and fruits using different techniques to prepare jam, jelly,	72. Fruits and Vegetable preservation – Collection of materials like fruits, vegetables. (04 hrs) 73. Practice on processing like grading, washing, peeling and dehydration by various	Importance of preservation. Processing instruments, bottling. Methods of preparation of squash, jam, Jelly, Sauce, pickle, ketchup. Preservatives. Storage, refrigeration.

	squash, sauce, pickle, ketchup etc. its preservation and storage. (NOS:AGR/N9420)	techniques using solar, electrical power. (04 hrs) 74. Practice –preparation of (05 hrs) (i) squash, (ii) jam, (iii) Jelly, (iv) Sauce & pickles of different fruits. 75. Use of preservatives like (07 hrs) (i) Chemicals, (ii) Sugar, (iii) Brim for fruits (iv) And vegetables Canning, (v) Bottling & leveling	Fermentation. Storage and storage conditions of processed materials. Standards and qualities. (06 hrs.)
Professional Skill 45Hrs; Professional Knowledge 12Hrs	Develop the Cultivation techniques of different vegetables and spice crops. (NOS:AGR/N0417, AGR/N0418, AGR/N0419)	76. Cultivation of Vegetables & Spices: (i) Raising individual and community plots of vegetables. (15 hrs) (ii) Raising museum plots of vegetables. (15 hrs) (iii) Practice on all cultural operations related to all impact points. (15 hrs) (iv) Package of practice of Spice Crops	Present situation of cultivation of different vegetable and spice crops. Cultivation of vegetables and spice with special emphasis on the impact point: (Climate, Land preparation, Variety (OP and F1 Hybrid), Planting materials, planting time, Spacing, intercultural operations, INMS. Requirement of Manures and Fertilizers, Interculture, Harvesting, grading, storage, packaging, transportation, Yield). Name of the Vegetables to be dealt with: Cucurbits (Sweet gourd, Bottle gourd, Bitter gourd, Ridge gourd, Pointed gourd, cucumber). Cauliflower, Cabbage, Red cabbage, Gherkin, Kohlrabi, Broccoli,

			Tomato, Brinjal, Okra, Radish, Carrot, Beet, Capsicum, Beans (Cowpea, French bean) Pea, Garlic, Onion and spinach, Parsley, Celery, China cabbage, Baby corn. Name of the Spices to be dealt with: Pepper, Cardamom, Clove, Cumin, Coriander, Chiili, Ginger, Turmeric, Garlic, Fennel, Fenugreek, Mustard, Tejpat. (12 hrs.)
Professional Skill 50Hrs; Professional Knowledge 18Hrs	Perform Floriculture and cultivation techniques for different Flowers, Climbers, Foliages and Medicinal plants to decorate. (NOS:AGR/N0718, AGR/N0702)	77. Cultivation of Flowers, Climbers, Foliages, Medicinal Plants & Other crops: (08 hrs) 78. Identification of Flowers ClimbersFoliages, Medicinal Plants & Other crops. (13 hrs) 79. Raising individual and community plots of flowers. (08 hrs) 80. Raising museum plots of flowers. (08 hrs) 81. Practice on all cultural operations related to all impact points. (13 hrs)	Rose, Tuberose, Gladiolus, China rose, Jasmine, Marigold, Chrysanthemum, Dahlia, Gerbera, Antirrhinum, Aster and other important flowers.Climbers, common and important foliages like dieffenbachia, anthurium, coleus, begonia, philodendrons palms etc. Medicinal plants like Aswagandha, Sarpagandha, Basaka, Stevia, Basil, Citronella, Rosemary, Thyme, Mentha, Aloe etc. and their package of practice. Care and management of potted plants. Selection of Climate, Land preparation, Variety, Planting materials, Planting time, Spacing, intercultural operations.Nutritional management, water management, Harvesting, storing, packaging, and marketing. (18 hrs.)

Professional Skill 45 Hrs; Professional Knowledge 12Hrs	Perform Cultivation of Betel Vine and Mushroom farming. (NOS:AGR/N7814, AGR/N7815)	82. Cultivation of Mushroom - Practice on production technique of all kinds of mushrooms. (15 hrs) 83. Betel vine -Practice on construction of vineyard. Preparation of soil in the vineyard. (15 hrs) 84. Propagation of vines. (15 hrs) (i) Planting, (ii) Manuring, (iii) Harvesting, (iv) Grading, (v) Marketing.	Package of Practice of Betel Vine: Climate, Land preparation, Variety, Planting materials, Planting time, Spacing, intercultural operations,nutritional management, watermanagement, Harvesting, post-harvest operations, storing, packaging, marketing). Package of practices different mushrooms: Paddy straw mushroom, Oyster mushroom, Button mushroom etc. (12 hrs.)
Professional Skill 45 Hrs; Professional Knowledge 12Hrs	Apply Pest Management and control the Pest and Diseases of Horticultural Crops. (NOS:AGR/N0403)	85. Pest Management: Pest management – (i) Identification of different classes of pesticides including bio-pesticides. (08 hrs.) (ii) Identification of bio-control agents. (09 hrs.) (iii) Preparation and application spray solution and dusts. (09 hrs.) (iv) Preparation of Bordeaux mixture and its application. (09 hrs.) (v) Identification of major insect pests and diseases of vegetables, fruit crops and other horticultural crops as dealt with in respective chapters. (10 hrs.)	Classes of insect pests' diseases. Concept of plant protection in general. Integrated Pest Management. Bio-control agents and bio-pesticides. Systematic waste disposal keeping environment pollution in view. (12 hrs.)
Professional Skill 45 Hrs;	Use techniques of Seed Production,	86. Seed Production, Marketing & Trade Management:	Seeds: Quality of seeds, classification of seeds –

Professional Knowledge 12Hrs	Processing and Packaging. (NOS:AGR/N7103, AGR/N7104)	Seed production - (i) Identification of classes of seeds, package of practices for seed production, processing of seeds, (15 hrs.) (ii) Packaging according to classes of seeds. (12 hrs.) (iii) Modern techniques of packaging. (11 hrs.) (iv) Packaging requirements. (07 hrs.)	breeder seeds, foundation seeds, certified seeds, TL seeds. Seed processing, Modern techniques of packaging seeds, Packaging requirements. Seed Act. (12 hrs.)
Professional Skill 20Hrs; Professional Knowledge 06Hrs	Maintain the records viz. Inventory Control, Maintenance of Records and Store management. (NOS:AGR/N9908)	87. Inventory control & maintenance of Records - (i) Practice on Stocking and issuing. (07 hrs) (ii) Maintenance of farm records like Cultivation Registers, Stock Book etc. (06 hrs) (iii) Stock verification. (07 hrs)	Methods of management of Store. Stocking and issuing. Maintenance of Farm Records like Cultivation Registers, Stock Book etc. (06 hrs.)
Professional Skill 20Hrs; Professional Knowledge 06Hrs	Conduct Market Survey and follow the legal requirement for trading as part of entrepreneurship development. (NOS:AGR/N9908)	88. Markets & Marketing – (10 hrs) (i) Study of markets, (ii) Survey techniques, (iii) Tabulation of data and interpretation. 89. Trade and trading – (10 hrs) (i) Visits to Trade Centers, (ii) Interviews for assessing trade problems. (iii) Visit to Export Houses and Centers.	Types of markets, Study of markets, Survey techniques. Trade : Its concept, scales of trade, trading requirements – licensing, registration, sales tax, other taxes; Pricing of products; Export of products – present scenario and potentials Group Discussion Entrepreneurship Development. (06 hrs.)
Project Work: **Broad areas:** a) Fruits and Vegetable preservation. b) Collection of materials like fruits, vegetables.			

c) Process like grading, washing, peeling and dehydration by various techniques using solar or electrical power.

SYLLABUS FOR CORE SKILLS
1. Employability Skills (Common for all CTS trades) (120 Hrs)

Learning outcomes, assessment criteria, syllabus and Tool List of Core Skills subjects which is common for a group of trades, provided separately in www.bharatskills.gov.in/ www.dgt.gov.in

List of Tools & Equipment			
HORTICULTURE (For batch of 24 Candidates)			
S No.	**Name of the Tools and Equipment**	**Specification**	**Quantity**
A. TRAINEES TOOL KIT (For each additional unit trainees tool kit sl. 1-9 is required additionally)			
1.	Measuring Tape	50 mtr	25(24+1) Nos.
2.	Pocket pH meter		25 (24+1) Nos.
3.	Magnifying Glass		25 (24+1) Nos.
4.	Budding and grafting knife		25 (24+1) Nos.
5.	Apron		25 (24+1) Nos.
6.	Safety goggles		25 (24+1) Nos.
7.	Hand gloves		25 (24+1) Nos.
8.	Safety shoes		25 (24+1) Nos.
9.	Helmet		25 (24+1) Nos.
B. SHOP TOOLS, INSTRUMENTS – For 2 (1+1) units no additional items are required			
Lists of Tools:			
10.	Spade a. With long Handle b. With Short Handle		25 Nos.
11.	Kudali		25 Nos.
12.	Khurpi		25 Nos.
13.	Hand hoe		25 Nos.
14.	Secateur		25 Nos.
15.	Pruning Saw		12 Nos.
16.	Budding & Grafting Knives		12 Nos.
17.	Rake		12 Nos.
18.	Rose Cane		5 Nos.
19.	Sprayer		
	a) Foot Sprayer		2 Nos.
	b) Hand Sprayer		4 Nos.
	c) Battery Operated Sprayer		4 Nos.
20.	Transplanting shovel		12 Nos.
21.	Measuring tap		5 Nos.
22.	Different types of ropes		12 Kg

23.	Different types of labels		5000 Nos.
24.	Stackes		5000 Nos.
25.	Lawn mover		1 No.
26.	Duster		2 Nos.
27.	Pruning knives		5 Nos.
28.	Hedge shears		5 Nos.
29.	Grass shears		5 Nos.
30.	Deshi plough		5 Nos.
31.	Tagari (Basket)		12 Nos.
32.	Hot Plate		1 No.
33.	Physical balance & weight box		1 No.
	Digital Balance	1gm to 5 kg	1 No.
34.	Sprinkler		1 No.
	Micro sprinkler Set		1 No.
	Drip irrigation Set		1 No.
	Fogger		1 No.
35.	Sword		1 No.
36.	Cutting, peeling, coring and pitting knives		12 Nos. each
37.	Spoons and forks		6 Nos.
38.	Counter pan balance with weights		1 No.
39.	Avery weighing scale		1 No.
40.	Physical balance		1 No.
41.	Pocket refractometer	0-30, 30-60, 60-90	1 No.
42.	Thermometer	0^0c – 15^0c	1 No.
43.	Brix hydrometer	0-30 c, 30-60c, 60-90c	1 No.
44.	Can vacuum testing gauge		1 No.
45.	Jelmeter		1 No.
46.	A simple R, O, sealing machine for bottles and jars		1 No.
47.	Can sealing machine manually-operated similar to Dixie sealer or the power driven		1 No.
48.	Crown corking machine, manually operated		1 No.
49.	Pressure cooker, burpee type		1 No.
50.	Preparation tables	6’ x 3’ x3’	2 Nos.

51.	Basket press, screw type juice extractor, manual.		1 No. each
52.	Lemon squeezers		12 Nos.
53.	Carbonation unit		1 Set
54.	Vinegar generator		1 Set
55.	Cans, bottles, jars, closures, labels as required		
56.	pH Meter		1 Set
57.	Evaporimeter		1 Set
58.	Wheel Hoe		1 Set
59.	Seed Drill		1 Set
60.	Pedal Thresher		1 Set
C. LIST OF EQUIPMENT			
61.	Plastic bucket		15 Nos.
62.	Seed sieve		1 No.
63.	Kerosene and gas stoves, charcoal ovens		2 Nos.
64.	Basin, buckets, sauce pans, mugs etc. (assorted)		10 Nos. each
65.	Stainless steel sieves		2 Nos.
66.	Wooden ladles		3 Nos.
67.	Raingauge		1 No.
68.	Max-Min Thermometer		1 No.
69.	Dry & wet bulb		1 No.
70.	Different fertilizer samples	N,P,K	1 Set
71.	Different Micronutrient Samples	Zn, Mg, Cu, Fe, B, Mo	1 Set
72.	Preserved Specimens of Pests and Diseases		1 Set
73.	Specimen of different Seeds		1 Set
D. SHOP FLOOR FURNITURE AND MATERIALS- For 2 (1+1) units no additional items are required.			
74.	Instructor's table		1 No.
75.	Instructor's chair		2 Nos.
76.	Metal rack	100 cm 150 cm x 45 cm	4 Nos.
77.	Lockers with 16 drawers standards size		2 Nos.
78.	Steel Almirah	2.5mx1.20mx0.5m	2 Nos.
79.	Black board/White board		1 No.

80.	Fire Extinguisher	Arrange all proper NOCs and equipment from municipal / competent authorities.	As per requirement
81.	Raingauge		1 No.
82.	Max-Min thermometer		1 No.
83.	Dry & wet bulb		1 No.

ABBREVIATIONS

CTS	Craftsmen Training Scheme
ATS	Apprenticeship Training Scheme
CITS	Craft Instructor Training Scheme
DGT	Directorate General of Training
MSDE	Ministry of Skill Development and Entrepreneurship
NTC	National Trade Certificate
NAC	National Apprenticeship Certificate
NCIC	National Craft Instructor Certificate
LD	Locomotor Disability
CP	Cerebral Palsy
MD	Multiple Disabilities
LV	Low Vision
HH	Hard of Hearing
ID	Intellectual Disabilities
LC	Leprosy Cured
SLD	Specific Learning Disabilities
DW	Dwarfism
MI	Mental Illness
AA	Acid Attack
PwD	Person with disabilities


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