



Model Curriculum

QP Name: Professional Gardening & Nursery Management

QP Code: AGR/Q0815

Version: 1.0

NSQF Level: 4.5

Model Curriculum Version: 1.0

Agriculture Skill Council of India || Unit No. 101, First Floor, Greenwoods Plaza,
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Training Parameters

Sector	Agriculture
Sub-Sector	Agriculture Crop Production
Occupation	Landscaping, Gardening & Urban Farming
Country	India
NSQF Level	4.5
Aligned to NCO/ISCO/ISIC Code	NCO-2015/6113.9900
Minimum Educational Qualification and Experience	12th grade pass or equivalent
Pre-Requisite License or Training	NA
Minimum Job Entry Age	18 Years
Last Reviewed On	31/08/2023
Next Review Date	31/08/2026
NSQC Approval Date	31/08/2023
QP Version	1.0
Model Curriculum Creation Date	31/08/2023
Model Curriculum Valid Up to Date	31/08/2026
Model Curriculum Version	1.0
Minimum Duration of the Course	1200 Hours
Maximum Duration of the Course	1200 Hours

Program Overview

This section summarizes the end objectives of the program along with its duration.

Training Outcomes

At the end of the program, the learner should have acquired the listed knowledge and skills to:

- Describe the process of raising saplings in the nursery for transplanting in the garden.
- Describe the process of propagating plants through vegetative means in open and poly-house conditions
- Describe the process of raising, maintaining, transplanting and harvesting seedlings.
- Explain the process of assisting in managing plant health and nursery operations.
- Explain the process of preparing to set up the garden.
- Describe the process of setting up the garden as per the plan.
- Demonstrate the process of designing, setting up and maintaining a rooftop garden.
- Demonstrate the process of caring and management of a vertical garden.
- Demonstrate the art of bonsai making.
- Demonstrate the process of carrying out greenhouse operations and maintaining the greenhouse.
- Demonstrate the process of setting up and maintaining the hydroponic system and plants/ crop.
- Demonstrate the process of setting up and maintaining the aeroponic farm.
- Demonstrate the process of carrying out harvesting, post-harvest management and marketing activities.
- Describe the process of preparing the lab and relevant lab equipment for plant tissue culture.
- Demonstrate the process of carrying out plant tissue culture under a controlled environment in a lab.
- Demonstrate the process of hardening and transplanting the tissue cultured plants.
- Explain the importance of maintaining the record of various lab operations carried out during plant tissue culture
- Set up and operate nursery under protected cultivation
- Carry out open and protected cultivation of flower crops
- Perform basic entrepreneurial activities for small enterprise
- Demonstrate various practices to ensure health and safety at work.
- Explain the importance of employability skills

Compulsory Modules

The table lists the modules and their duration corresponding to the Compulsory NOS of the QP.

NOS and Module Details	Theory Duration	Practical Duration	On-the-Job Training Duration (Mandatory)	On-the-Job Training Duration (Recommended)	Total Duration
AGR/N0801: Raise saplings in the nursery for transplanting in the garden NOS Version- 2.0 NSQF Level- 4	15:00	15:00	0:00	00:00	30:00
Module 1: Introduction to the field of Horticulture	05:00	00:00	0:00	00:00	05:00
Module 2: Process of raising saplings in the nursery for transplanting in the garden	10:00	15:00	0:00	00:00	25:00
AGR/N0820: Raise, maintain, transplant and harvest seedlings NOS Version- 2.0 NSQF Level- 3	10:00	20:00	0:00	00:00	30:00
Module 3: Process of raising, maintaining, transplanting and harvesting seedlings	10:00	20:00	0:00	00:00	30:00
AGR/N0821: Assist in managing plant health and nursery operations NOS Version- 2.0 NSQF Level- 3	40:00	50:00	0:00	00:00	90:00
Module 4: Process of assisting in managing plant health and nursery operations	40:00	50:00	0:00	00:00	90:00
AGR/N0802: Prepare to set up the garden NOS Version- 2.0 NSQF Level- 4	15:00	15:00	0:00	00:00	30:00
Module 5: Process of preparing to set up the garden	15:00	15:00	0:00	00:00	30:00
AGR/N0803: Set up the garden as per the plan NOS Version- 2.0 NSQF Level- 4	10:00	20:00	0:00	00:00	30:00

Module 6: Process of setting up the garden as per the plan	10:00	20:00	0:00	00:00	30:00
AGR/N0843 Design, set up and maintain a rooftop garden NOS Version- 1.0 NSQF Level-4	15:00	15:00	0:00	0:00	30:00
Module 7: Process of designing, setting up and maintaining a rooftop garden	15:00	15:00	0:00	0:00	30:00
AGR/N0847 Carry out vertical gardening NOS Version- 1.0 NSQF Level-4	15:00	15:00	0:00	0:00	30:00
Module 8: Process of maintaining a vertical garden	15:00	15:00	0:00	0:00	30:00
AGR/N0848 Create a bonsai tree NOS Version- 1.0 NSQF Level-4	10:00	20:00	0:00	0:00	30:00
Module 9: Process of making a bonsai	10:00	20:00	0:00	0:00	30:00
AGR/N1008 Carry out greenhouse operations and maintain the greenhouse NOS Version- 2.0 NSQF Level- 3	30:00	60:00	0:00	0:00	90:00
Module 10: Process of carrying out operations and maintenance of the greenhouse	30:00	60:00	0:00	0:00	90:00
AGR/N0822 Set up and maintain the hydroponic system and plants/ crop NOS Version- 2.0 NSQF Level- 4	25:00	35:00	0:00	0:00	60:00
Module 11: Process of setting up and maintain the hydroponic system and plants/ crop	25:00	35:00	0:00	0:00	60:00
AGR/N0846 Set up and maintain the aeroponic farm NOS Version- 1.0 NSQF Level- 4	10:00	20:00	0:00	0:00	30:00

Module 12: Process of setting up and maintaining the aeroponic farm	10:00	20:00	0:00	0:00	30:00
AGR/N0823 Carry out harvesting, post-harvest management and marketing activities NOS Version- 2.0 NSQF Level- 4	15:00	15:00	0:00	0:00	30:00
Module 13: Process of carrying out harvesting, post-harvest management and marketing activities	15:00	15:00	0:00	0:00	30:00
AGR/N8102 Prepare for plant tissue culture NOS Version- 2.0 NSQF Level- 4	15:00	15:00	0:00	0:00	30:00
Module 14: Preparation for plant tissue culture	15:00	15:00	0:00	0:00	30:00
AGR/N8103 Carry out plant tissue culture NOS Version- 2.0 NSQF Level- 4	20:00	40:00	0:00	0:00	60:00
Module 15: Propagation of plants through plant tissue culture	20:00	40:00	0:00	0:00	60:00
AGR/N8115 Transplant the tissue cultured plants and maintain records NOS Version- 1.0 NSQF Level- 4	10:00	20:00	0:00	0:00	30:00
Module 16: Transplantation of the tissue cultured plants and record-keeping	10:00	20:00	0:00	0:00	30:00
AGR/N1011: Set up and maintain nursery under protected condition NOS Version 1.0 NSQF Level 5	30:00	60:00	00:00	00:00	90:00
Module 17: Setting up a nursery under protected Cultivation	07:00	10:00	00:00	00:00	17:00
Module 18: Nurturing seedlings under protected Cultivation	15:00	25:00	00:00	00:00	40:00

Module 19: Nursery operations and harvesting	08:00	25:00	00:00	00:00	33:00
AGR/N1013: Carry out protected cultivation offlower crops NOS Version 1.0 NSQF Level 5	30:00	60:00	00:00	00:00	90:00
Module 20: Preparing for flower cultivation under protected cultivation	06:00	12:00	00:00	00:00	18:00
Module 21: Planting a flower crop	08:00	16:00	00:00	00:00	24:00
Module 22: Nurturing a flower crop	08:00	16:00	00:00	00:00	24:00
Module 23: Harvesting a flower crop	08:00	16:00	00:00	00:00	24:00
AGR/N9908: Undertake basic entrepreneurial activities for small enterprise NOS Version 3.0 NSQF Level 4	20:00	10:00	00:00	00:00	30:00
Module 24: Basic entrepreneurial activities	20:00	10:00	00:00	00:00	30:00
AGR/N9903 Maintain health and safety at the workplace NOS Version- 4.0 NSQF Level- 4	05:00	25:00	0:00	00:00	30:00
Module 25: Hygiene and cleanliness	02:00	10:00	0:00	00:00	12:00
Module 26: Safety and emergency procedures	03:00	15:00	0:00	00:00	18:00
DGT/VSQ/N0102: Employability Skills (60 Hours) NOS Version- 1.0 NSQF Level- 4	60:00	00:00	0:00	00:00	60:00
Module 27: Employability Skills	60:00	00:00	0:00	00:00	60:00
Total Duration	400:00	530:00	270:00	00:00	1200:00

Module Details

Module 1: Introduction to the field of Horticulture

Bridge Module, Mapped to AGR/N0801 v2.0

Terminal Outcomes:

- Discuss the opportunities in the field of Horticulture.

Duration: 05:00	Duration: 0:00
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> • Describe the size and scope of the agriculture industry and its sub-sectors. • Describe different branches of horticulture. • Identify various employment opportunities in Amenity Horticulture/Gardening and Nursery Management. • Explain the morphology and physiology of plants 	
Classroom Aids	
Training Kit - Trainer Guide, Presentations, Whiteboard, Marker, Projector, Laptop, Video Films	
Tools, Equipment and Other Requirements	
NA	

Module 2: Process of raising saplings in the nursery for transplanting in the garden

Mapped to AGR/N0801 v2.0

Terminal Outcomes:

- Explain the process of preparing for nursery operations.
- Explain the process of preparing the nursery bed.
- Describe the process of propagating saplings through seeds.
- Describe the process of propagating plants through cutting, root division, layering and budding.

Duration: 10:00	Duration: 15:00
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> • Explain applicable record-keeping requirements in the job role. • List various resources required for setting up a nursery. • Explain various types of seedbed such as raised/ level/ sunken. • Describe the process of preparing a nursery bed and seedbed. • List the variety of material required for propagating plants in a nursery. • List the relevant tools and equipment and their correct use. • Explain the safe use of fertilizers, pesticides and insecticides. • State the water requirements of different types of saplings. 	<ul style="list-style-type: none"> • Demonstrate the process of constructing the shade net house, low tunnel poly/net house, store-room, compost area, etc. • Demonstrate the process of erecting framed structures such as poly-tunnels, hardening chamber, mist chamber for plant propagation. • Show how to prepare farmyard manure or compost as per the Standard Operating Procedure (SOP). • Demonstrate the process of conducting a soil test to identify the soil treatment requirements. • Demonstrate the process of applying the necessary treatment on the soil as per the requirement. • Demonstrate the process of applying fertilizers, farmyard manure or compost uniformly on the field in the recommended quantity. • Show how to puddle the field for the recommended duration of time. • Show how to level the field using an appropriate implement. • Demonstrate the process of carrying out pre-sowing treatment of the seeds. • Demonstrate the process of sowing seeds in the seedbed, poly bags and containers at the recommended depth.

- Demonstrate the process of applying the recommended quantity of water and manure/ fertilizer on the sown seeds as per the SOP.
- Demonstrate how to acclimatise the saplings before transplanting.
- Show how to extract stems of the recommended specifications from the plant.
- Show how to cover the stem / tip / trunk of the plant with soil according to the selected method.
- Demonstrate the process of applying the recommended quantity of water and fertilizer to support the growth of roots.
- Demonstrate the process of applying the approved pesticides/ insecticides to protect the plants from pests and diseases.
- Demonstrate the process of maintaining the record of nursery operations.

Classroom Aids

Training Kit (Trainer Guide, Presentations). Whiteboard, Marker, Projector, Laptop

Tools, Equipment and Other Requirements

Hose pipes, Shears, Loppers, Weeder, Hedge cutters, Sickle, Pit for dry leaves, Water pumps & equipment, Green house /shade house, Watering timers & controllers, Hand gloves, Sprinklers, Spade, Perforated poly bags, Pots, Water cans, Hand cutter, Knapsack sprayers, Different types of seeds, Bulbs, Trowel, Plant seedlings/cuttings, Seedling trays, Rake, Baskets, Hoe, Weedicides, Plant labels, Fertilizers, Khurpi, Mask, Safety boots, First aid kit, Installed Video camera with high resolution and recording facility, Broom, Pesticides, Axe, Jute & pvc bags

Module 3: Process of raising, maintaining, transplanting and harvesting seedlings

Mapped to ARG/N0820 v2.0

Terminal Outcomes:

- Explain the process of preparing to raise seedlings.
- Describe the process of raising seedlings for transplantation.
- Describe the process of carrying out harvesting and post-harvesting activities.
- Describe the process of transplanting the seedlings.

Duration: 10:00	Duration: 20:00
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> • Explain the applicable record-keeping requirements. • Explain the correct use of the relevant nursery tools, implements and PPE. • List various inputs required in nursery operations such as different types of fertilizers, pesticides, containers, poly bags, etc. • State the depth recommended for planting different varieties of plant seeds in containers/ poly bags/ germination beds. • List various inputs required in nursery operations such as different types of fertilizers, pesticides, containers, poly bags, etc. • State the appropriate level of moisture and temperature to aid germination of seeds. • Explain the recommended quantity and correct way of applying insecticides/ pesticides on seedlings. • Describe different practices to protect seedlings from excessive heat/ cold and strong winds. • Explain the conditions required for the healthy growth of seedlings. • List various inputs required in nursery operations such as different types of fertilizers, pesticides, containers, poly bags, etc. • Describe the correct method of 	<ul style="list-style-type: none"> • Demonstrate how to sort out the seeds of poor quality. • Demonstrate the process of preparing the correct mixture of soil and manure/ fertilizer. • Demonstrate the process of preparing the containers/ poly bags/ germination beds of the appropriate size for planting seeds. • Show how to fill in the containers/ poly bags with the prepared soil. • Demonstrate the process of planting seeds in containers/ poly bags/ germination beds at the depth recommended for the seed variety. • Demonstrate the process of applying the recommended quantity of fertilizers and insecticides on seedlings while protecting them from damage. • Show how to remove dead and unhealthy seedlings as per the Standard Operating Procedure (SOP). • Demonstrate the process of harvesting seedlings at their appropriate stage of growth. • Show how to pack the flowers appropriately in cardboard boxes for being transported. • Demonstrate the process of preparing the appropriate type of nursery bed such as sunken bed, level bed, raised bed for transplantation of

<p>harvesting and transplanting seedlings.</p> <ul style="list-style-type: none"> Describe post-harvest processing of flowers. 	<p>seedlings.</p> <ul style="list-style-type: none"> Show how to create holes of the recommended dimensions in the soil. Show how to plant the seedlings in the holes and fill them with soil. Demonstrate the process of applying mulch or compost around the seedlings. Demonstrate the process of maintaining the record of seedlings transplanted in the nursery.
Classroom Aids	
Training Kit (Trainer Guide, Presentations). Whiteboard, Marker, Projector, Laptop	
Tools, Equipment and Other Requirements	
Hose pipes, Shears, Loppers, Weeder, Hedge cutters, Sickle, Pit for dry leaves, Water pumps & equipment, Green house /shade house, Watering timers & controllers, Hand gloves, Sprinklers, Spade, Perforated poly bags, Pots, Water cans, Hand cutter, Knapsack sprayers, Different types of seeds, Bulbs, Trowel, Plant seedlings/cuttings, Seedling trays, Rake, Baskets, Hoe, Weedicides, Plant labels, Fertilizers, Khurpi, Mask, Safety boots, First aid kit, Installed Video camera with high resolution and recording facility, Broom, Pesticides, Axe, Jute & pvc bags	

Module 4: Process of assisting in managing plant health and nursery operations

Mapped to AGR/N0821 v2.0

Terminal Outcomes:

- Elucidate ways to manage the nutrient requirements of plants.
- Elucidate ways to protect plants from pests and diseases.
- Explain the process of assisting in managing nursery operations.

Duration: 40:00	Duration: 50:00
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> • Explain the importance of customer-centric approach and customer-service skills. • Discuss various plant health and pest/disease management practices. • Explain different types of plant growth regulators and their correct use. • Describe basic repair and maintenance process of nursery infrastructure. • Explain the importance of following environmental and ecological best practices to minimise the impact on the environment. 	<ul style="list-style-type: none"> • Demonstrate the process of applying the appropriate plant growth regulators such as abscisic acid, gibberellins, cytokinins, ethylene using the recommended application method. • Demonstrate the process of applying fertilizers and water on the plants with the recommended quantity at appropriate intervals. • Demonstrate the process of carrying out trimming and pruning of the plants as per the instructions received. • Demonstrate the process of applying the relevant treatment to free the plants from the identified pests/diseases. • Prepare sample record of the insecticides/ pesticides used on plants. • Show how to remove the sources of mosquito breeding. • Demonstrate the process of carrying out treatment of waste water as per instructions from the supervisor. • Demonstrate the process of carrying out basic repair and maintenance of the nursery infrastructure, tools and implements. • Prepare sample records such as use of plant growth regulators/ fertilizers/ pesticides, plant growth, sales and payments.

Classroom Aids

Training Kit (Trainer Guide, Presentations). Whiteboard, Marker, Projector, Laptop

Tools, Equipment and Other Requirements

Hose pipes, Shears, Loppers, Weeder, Hedge cutters, Sickle, Pit for dry leaves, Water pumps & equipment, Green house /shade house, Watering timers & controllers, Hand gloves, Sprinklers, Spade, Perforated poly bags, Pots, Water cans, Hand cutter, Knapsack sprayers, Different types of seeds, Bulbs, Trowel, Plant seedlings/cuttings, Seedling trays, Rake, Baskets, Hoe, Weedicides, Plant labels, Fertilizers, Khurpi, Mask, Safety boots, First aid kit, Installed Video camera with high resolution and recording facility, Broom, Pesticides, Axe, Jute & pvc bags

Module 5: Process of preparing to set up the garden

Mapped to AGR/N0802 v2.0

Terminal Outcomes:

- Explain the process of planning to set up the garden.
- Elucidate ways to arrange the necessary resources.

Duration: 15:00	Duration: 15:00
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> • Explain various parameters to assess while conducting a site survey before establishing a garden. • List the suitable soil and climate conditions for setting up a garden. • Explain varieties of trees, plants, grass, shrubs, hedges and edges used in gardens. • List variety of material required for setting up a garden such as plants, shrubs, fertilizers, pesticides, tools, equipment, Personal Protective Equipment (PPE), etc. • Explain the importance of conducting a soil test before planting a garden and applying the necessary soil treatment to improve the quality of soil. • Discuss basic practices related to maintaining the record of purchase and payments. 	<ul style="list-style-type: none"> • Roleplay how to conduct a survey of the site proposed for setting up the garden. • Show how to calculate the spacing between plants/ trees/ shrubs and rows as per their variety and available land area. • Show how to prepare and execute the layout of the garden based on the assessment of client requirements. • Demonstrate the process of maintaining the record of purchase.
Classroom Aids	
Training Kit (Trainer Guide, Presentations). Whiteboard, Marker, Projector, Laptop	
Tools, Equipment and Other Requirements	
Hose pipes, Shears, Loppers, Weeder, Hedge cutters, Sickle, Pit for dry leaves, Water pumps & equipment, Green house /shade house, Watering timers & controllers, Hand gloves, Sprinklers, Spade, Perforated poly bags, Pots, Water cans, Hand cutter, Knapsack sprayers, Different types of seeds, Bulbs, Trowel, Plant seedlings/cuttings, Seedling trays, Rake, Baskets, Hoe, Weedicides, Plant labels, Fertilizers, Khurpi, Mask, Safety boots, First aid kit, Installed Video camera with high resolution and recording facility, Broom, Pesticides, Axe, Jute & pvc bags	

Module 6: Process of setting up the garden as per the plan

Mapped to AGR/N0803 v2.0

Terminal Outcomes:

- Explain the process of preparing the field for planting.
- Describe the process of planting the garden.
- Describe the process of setting up garden features and irrigation or fertigation system.
- Describe the process of preparing the flower bed.

Duration: 10:00	Duration: 20:00
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> • Describe the correct method and depth of tilling a field for gardening. • List various material used for treating garden soil. • Explain the importance of having effective drainage in the garden. • Describe the process of preparing a nursery bed. • Explain different garden features and their installation process. • Explain the importance of following environmental and ecological best practices to minimise the impact on the environment. 	<ul style="list-style-type: none"> • Show how to remove all roots, debris and waste material from the land. • Demonstrate the process of applying the necessary treatment on the soil such as relevant chemicals, peat, lime, manure, compost, etc. • Show how to remove weeds from the land. • Show how to prepare rows and holes for planting seeds/ plants as per the planned layout. • Demonstrate the process of planting trees/ plants/ shrubs/ grass/ hedges and edges in the selected pattern maintaining the required spacing. • Demonstrate the process of applying soil cover on the planted roots of the trees/ plants/ shrubs/ grass/ hedges and edges. • Demonstrate the process of apply an appropriate type of fertilizer/ manure/ mulch on the roots of the hedges and edges. • Demonstrate the process of installing supports for the relevant types of plants to help them grow as intended. • Show how to erect fences around the garden to protect it from animals. • Show how to sort out damaged and unhealthy seeds. • Demonstrate the process of planting the seeds as per the SOP.

- Show how to prepare potting mixture using the recommended ingredients.
- Demonstrate the process of planting the vegetables and fruit plants.
- Demonstrate the process of carrying out potting and repotting for the optimum growth of potted plants.
- Demonstrate the process of setting up appropriate irrigation system such as drip irrigation, sprinkler irrigation, subsurface irrigation.
- Demonstrate the process of installing fertigation system as per the requirement.
- Demonstrate the process of installing various garden features such as walkways, statues, fountain as per the layout.
- Show how to remove any existing grass/ plants/ debris from the spot.
- Show how to till the soil to the recommended depth.
- Demonstrate the process of preparing the flower bed as per the Standard Operating Procedure (SOP).
- Demonstrate the process of planting flowering plants such as bulbs, orchids, succulents, cacti in combination with bedding plants.

Classroom Aids

Training Kit (Trainer Guide, Presentations). Whiteboard, Marker, Projector, Laptop

Tools, Equipment and Other Requirements

Hose pipes, Shears, Loppers, Weeder, Hedge cutters, Sickle, Pit for dry leaves, Water pumps & equipment, Green house /shade house, Watering timers & controllers, Hand gloves, Sprinklers, Spade, Perforated poly bags, Pots, Water cans, Hand cutter, Knapsack sprayers, Different types of seeds, Bulbs, Trowel, Plant seedlings/cuttings, Seedling trays, Rake, Baskets, Hoe, Weedicides, Plant labels, Fertilizers, Khurpi, Mask, Safety boots, First aid kit, Installed Video camera with high resolution and recording facility, Broom, Pesticides, Axe, Jute & pvc bags

Module 7: Process of designing, setting up and maintaining a rooftop garden

Mapped to AGR/N0843 v1.0

Terminal Outcomes:

- Discuss various parameter to assess for setting up a rooftop garden.
- Demonstrate the process of setting up the rooftop garden.
- Describe the process of carrying out the repair and maintenance of a rooftop garden.

Duration: 15:00	Duration: 15:00
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> • Explain various parameters to assess while planning a rooftop garden. • Explain the importance of planning rooftop garden plants and features according to the roof's loading capacity. • List various materials of appropriate size and weight for setting up a rooftop garden. • Explain different ways of waterproofing a rooftop garden. • List varieties of trees, plants, and shrubs suitable for a rooftop garden. • Describe the process of installing windbreaks and appropriate support to provide shade for rooftop plants, trees, and shrubs. 	<ul style="list-style-type: none"> • Show how to assess various parameters while planning a rooftop garden such as the roof's loading capacity, climatic conditions, sunlight and wind exposure, etc. • Prepare a sample plan for the rooftop garden. • Show how to plant trees, plants, and shrubs in a rooftop garden. • Demonstrate the process of installing windbreaks, and shading for the plants, trees, and shrubs. • Demonstrate the process of carrying out repair and maintenance of the rooftop garden, garden features, irrigation and drainage system.
Classroom Aids	
Training kit (Trainer guide, Presentations)	
Tools, Equipment and Other Requirements	
Kassi / Spade, Khurpi, Weeder, Side shear, Broom, Rake, Watering Can, Hand hose, Bucket, Plant Pruner, Wheel Barrow, Hand Sprayer, Budding & Grafting Set, Earthen Pots, Hedge Cutter, Polythene Bags (Garbage), Seed Packets, Gunny bags, Tags-labels, Budding-tape, Sutli, Moss-grass, etc.	

Module 8: Process of caring and management of a vertical garden

Mapped to AGR/N0847 v1.0

Terminal Outcomes:

- Discuss various parameter to assess for setting up a vertical garden.
- Identify suitable plant species for planting in a vertical garden.
- Demonstrate the process of carrying out care and management of a vertical garden.

Duration: 15:00	Duration: 15:00
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> • List different types of vertical garden structure • Explain various parameters to assess the structure of a vertical garden. • Explain the importance of planning vertical garden plants and features according to the vertical wall's loading capacity. • Describe different types of planters available for vertical gardening. • List various factors on which selection of plants depend. • List the plant species suitable for a vertical garden- indoor green walls / for shaded areas and For outdoors/exterior green walls • Describe the parameters to be monitored regularly for a healthy and productive garden. • Explain the light and water requirement of different plant species. • Explain the method of applying fertilizers/soil ameliorants • Explain the method of irrigation and pest control in a vertical garden. • Explain the need of pruning, trimming and training in a vertical garden. 	<ul style="list-style-type: none"> • Show how to assess various parameters while monitoring a vertical garden • Identify different plant species suitable for a vertical garden. • Show how to plant seeds/seedlings in a vertical garden. • Demonstrate various maintenance activities undertaken in a vertical garden. • Demonstrate pruning and training of plants.
Classroom Aids	
Training kit (Trainer guide, Presentations)	

Tools, Equipment and Other Requirements

Trellis, poles, arches, hanging pots, planters, Side shear, Broom, Rake, Watering Can, Hand hose, Bucket, Plant Pruner, Wheel Barrow, Hand Sprayer, Budding & Grafting Set, Budding-tape, Seed Packets

Module 9: Process of making a bonsai

Mapped to AGR/N0848 v1.0

Terminal Outcomes:

- Identify different plant species and containers suitable for bonsai.
- Demonstrate the process of planting, care and maintenance of bonsai.

Duration: 10:00	Duration: 20:00
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> • Describe the basic principles of bonsai making. • Classify bonsai based on size, shape and style. • List different types of containers/trays used for bonsai. • List species of trees suitable for a bonsai. • Describe the steps in bonsai making. • Describe the methods of propagation in bonsai. • Describe the factors to be considered when choosing a location for display of a bonsai. 	<ul style="list-style-type: none"> • Show how to prepare a potting mixture. • Demonstrate the process of potting and repotting of a bonsai tree. • Demonstrate the process of pinching, pruning and trimming of bonsai. • Show how to wire and train the branches of bonsai. • Demonstrate the process of trimming the roots of a bonsai. • Demonstrate various maintenance activities undertaken for a bonsai. • Display bonsai specimens in an indoor/ outdoor setting.
Classroom Aids	
Training kit (Trainer guide, Presentations)	
Tools, Equipment and Other Requirements	
Plant, trays/containers, bonsai table, Potting mixture, Potting sticks, Sieves, Copper wire, Wire cutter, Pruning knife and secateurs, Watering cane and tub, leaf cutter with long handle, small shear, butterfly shear, large concave cutter, rake, coco brush.	

Module 10: Process of carrying out operations and maintenance of the greenhouse

Mapped to AGR/N1008 v2.0

Terminal Outcomes:

- Demonstrate the process of planting and maintaining seeds, vegetables and plants.
- Demonstrate the process of harvesting, acclimatising and transplanting seedlings and plants.
- Demonstrate the process of harvesting the flowers and vegetables.
- Demonstrate the process of carrying out post-harvest processing and marketing of flowers and vegetables.
- Describe the process of maintaining the greenhouse.

Duration: 30:00	Duration: 60:00
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> • State the water requirements of different types of seeds, vegetables, flowers and plants. • List signs of pests and disease in the seedlings, vegetables, flowers and plants. • Explain the importance of maintaining the recommended temperature, humidity and sunlight exposure in the greenhouse. • Explain the importance of storing the harvested flowers and vegetables at the recommended temperature, humidity and hygienic conditions. • Explain post-harvest processing and marketing of flowers and vegetables i.e. sorting and grading, cleaning and marketing. • Explain the importance of maintaining cleanliness in the greenhouse. • Explain the criteria for segregating waste into appropriate categories. • Explain the procedure to report inappropriate behaviour e.g., harassment. 	<ul style="list-style-type: none"> • Demonstrate the process of preparing the raised, flat or sunken bed in the greenhouse. • Demonstrate the process of planting seeds, vegetables and different types of plants in the greenhouse. • Show how to water the planted seeds, vegetables, flowers and plants with the recommended quantity. • Demonstrate the process of applying fertilizers in the recommended quantity to promote the healthy growth of seedlings, vegetables and plants. • Demonstrate the process of applying the recommended pesticides and insecticides to control pest and disease infestation. • Show how to remove the dead and damaged seedlings, vegetables, flowers and plants. • Demonstrate how to apply herbicides and weedicides and carry out manual weeding to prevent unwanted growth in the greenhouse. • Demonstrate the process of carrying out repair and maintenance of the irrigation or fertigation system. • Prepare a sample manual and/ or

	<p>electronic record of herbicides, weedicides fertilizers, pesticides and insecticides used in the greenhouse.</p> <ul style="list-style-type: none"> • Demonstrate the process of harvesting the seedlings and plants. • Show how to acclimatise the seedlings and plants under the recommended temperature, protecting them from harsh conditions. • Show how to transplant the acclimatised seedlings and plants in the garden. • Demonstrate the process of harvesting the flowers and vegetables using the appropriate tools. • Demonstrate the process of carrying out sorting and grading the flowers and vegetables. • Show how to clean the vegetables using clean water and recommended cleaning agents. • Demonstrate the process of preparing the hydration solution and applying it to the flowers to maintain their freshness. • Demonstrate how to process the payments using the appropriate e-payment methods. • Prepare a sample record of sales and payments using the physical registers and/ or the relevant computer application. • Demonstrate the process of cleaning the greenhouse through sweeping and removal of the trash. • Demonstrate the process of carrying out repair and maintenance of the greenhouse structure. • Demonstrate the process of recycling and disposing different types of waste appropriately. • Demonstrate appropriate verbal and non-verbal communication that is
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	respectful of genders and disability.
Classroom Aids	
Training Kit - Trainer Guide, Presentations, Whiteboard, Marker, Projector, Laptop, Video Films	
Tools, Equipment and Other Requirements	
Plant Markers; Spraying Equipment for the application of Insecticides, Herbicides, Fungicides and Fertilisers; Water Equipment including Sprinkler System, Pumps, Distribution Lines, Hoses, Nozzles, Fertiliser Injectors and Propagation Misters, Sickle, Hoe, Khurpa, Spade, Hand Trowel, Cocopeat; Compost/ Vermicompost	

Module 11: Process of setting up and maintaining the hydroponic system and plants/ crop

Mapped to AGR/N0822 v2.0

Terminal Outcomes:

- Describe the process of selecting the crop/ plant and site for hydroponic farming.
- Demonstrate the process of propagating seedlings for hydroponic farming.
- Demonstrate the process of setting up the hydroponic system.
- Describe the process of maintaining the hydroponic system and plants/ crops.
- Demonstrate the process of carrying out irrigation and fertigation.

Duration: 25:00	Duration: 35:00
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> • Explain the applicable work modalities and requirements for hydroponic farming. • Explain different types of hydroponics systems. • Describe the process of testing seed/ grain for germination. • Describe the seed treatment process. • Describe the process of hydroponic cultivation using the relevant automated systems. • Explain various substrates used in hydroponic farming. • Explain the application of the Deep Flow Technique (DFT) and Nutrient Film Technique (NFT). • Explain the operations of the greenhouse and its efficiency. • State different types of nutrient solutions, their composition and application. • Explain the impact of different climatic conditions on hydroponic farming. • Explain the use of hydroponics kits and home hydroponic units. • Explain the criteria for selecting the location, plant varieties and substrate/ growth medium for 	<ul style="list-style-type: none"> • Demonstrate the process of using coco peat, rice husk, and sand peat to raise seedlings. • Demonstrate how to sterilise the growing medium before use. • Show how to clean and sterilise the pots and trays before sowing seeds. • Demonstrate the process of applying the nutrient solution in the recommended quantity to the trays and pots and sowing the seeds. • Demonstrate the process of harvesting the seedlings at the appropriate stage of their growth to be transplanted in the appropriate hydroponic system. • Show how to create holes in Polyvinyl Chloride (PVC) pipes for DFT and insert plants placed in plastic net pots, in the holes made in PVC pipes. • Demonstrate the process of sterilising the growing medium before use. • Demonstrate how to place plants in growing tubes and suspend them into water. • Demonstrate the use of non-circulating methods for nutrient application such as root dipping technique, floating technique, capillary action technique, etc.

hydroponic farming.

- Explain the benefits and process of setting up different types of hydroponic systems such as Deep-Water Culture (DWC) system, wick system, drip system, Ebb and Flow (Flood and Drain), and NFT.
- Explain different types of materials, tools and equipment required for setting up different types of hydroponic systems.
- State different types of materials used for preparing the substrate/ growth medium such as coco coir, coco chips, perlite, vermiculite, peat moss, lava rock, river rock, etc.
- Describe the process of preparing the nutrient solution and the different types of nutrients used in it.
- Explain the criteria for selecting a suitable cultivar for hydroponic propagation.
- Explain the root architecture and surface chemistry of different plant species and their role in water and nutrient uptake.
- State the essential plant nutrient elements and the criteria for essentiality.
- Explain the symptoms of plant nutrient element deficiency and excess.
- State the frequency and rate of nutrient solution dosing of plant roots.
- State the common compounds and elements, their permissible levels to be maintained in water for general hydroponic use.
- Explain the characteristics of high-quality irrigation water.
- Describe the process of filtering and sterilising the water and nutrient solution.
- Explain the need of making appropriate adjustments to the

- Demonstrate the use of the relevant lighting system, such as the solar lighting system.
- Show how to drain out the rainwater from the site to ensure no waterlogging.
- Demonstrate how to clean and monitor the condition of motors controlling water tanks, pumps, and growing trays.
- Demonstrate the process of using the recommended treatment to maintain the pH level of the water.
- Show how to clean the floor and maintain it dry in the hydroponic system.
- Show how to position the grains appropriately on growing trays to prevent waterlogging in them.
- Demonstrate the use of mesh filters for regular cleaning.
- Demonstrate the process of carrying out manual or auto-misting of the crop and plants with water to prevent the harmful effects of temperature.
- Demonstrate the use of nets for aeration and to prevent birds and animals from preying on the plants/ crop.
- Demonstrate the use of a pH meter.
- Demonstrate the use of the oxygen meter with mobile application support and alarm to monitor the level of dissolved oxygen in the nutrient solution.
- Demonstrate the process of cleaning the hydroponic system regularly using chlorine or other recommended treatment and flushing the system with clean water before replanting.
- Demonstrate the use of auto-cleaning systems for cleaning in large-scale hydroponic systems.
- Demonstrate the process of carrying out artificial pollination using blowers

<p>nutrient solution according to plant species.</p> <ul style="list-style-type: none"> • State the appropriate nutrient solution temperature to be maintained. • Explain the Electrical conductivity (EC) of a nutrient solution and how to maintain it in the rooting medium. • Explain the important electrical, electronic and environmental parameters to be maintained in a hydroponic system such as air, wind, humidity, temperature and water quality parameters. • Describe the process of raising seedlings for hydroponics farming. • State the appropriate pH levels to be maintained in the hydroponics system. • Describe the process to be followed for the production of the contamination-free crop. • State the appropriate method and timing for the application of nutrient solutions to plants and crops in hydroponics systems. • Explain the relevant medium-less hydroponic systems, their advantages and their limitations. 	<p>and using mechanical vibrators to improve air quality within the protected hydroponic system structures.</p> <ul style="list-style-type: none"> • Demonstrate the process of installing artificial supporting structures and training tall-growing intermediate crop varieties such as tomatoes and cucumber, and crops bearing heavy produce such as bell pepper, eggplant, etc. • Show how to tie strings at the base of each plant with an appropriate material such as polythene. • Demonstrate the process of carrying out the pruning of plants using the appropriate tools and implements. • Demonstrate the process of carrying out irrigation of plants using the drip irrigation system. • Demonstrate the process of mixing the appropriate fertilisers with the daily water requirement and applying it manually or by using a fertigation system/nutrient tank. • Prepare a sample record of irrigation and fertigation of the crop.
Classroom Aids	
Training Kit (Trainer Guide, Presentations). Whiteboard, Marker, Projector, Laptop	
Tools, Equipment and Other Requirements	
Greenhouse / Polyhouse with Ongoing Hydroponic Cultivation (Media or Solution Based), Temperature and Humidity Meter, EC And Ph Meter – 3 Different Types That Are Commonly Used in India, Mister, Fogger, Circulatory Fans, Drip Irrigation System with Aero Drippers, Inner (Net) Curtain, Automated Fertigation and Humidity Control Mechanism (Sand Filter, Disc Filter, Motor, Valves, Pressure Gauge), PAR Meter (Photosynthetically Active Radiation)	

Module 12: Process of setting up and maintaining the aeroponic farm

Mapped to ARG/N0846 v1.0

Terminal Outcomes:

- Demonstrate the process of setting up the aeroponic farm.
- Describe the process of maintaining the aeroponic farm.
- Demonstrate various practices for effective resource optimisation.

Duration: 10:00	Duration: 20:00
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> • Describe the process of preparing the root chamber for growing plants under the aeroponic system. • Explain the importance of ensuring the growth chamber is light-proof, with good air circulation and an ability to hold humidity. • State the recommended ratio of water, nutrients and hormones to be maintained in the nutrient spray solution. • Explain the importance and process of setting up and testing an automatic controller to automate the release of nutrient spray solution. • Describe the process of planting different types of plants in an aeroponic farm. • Explain how to carry out common repair and maintenance of the submersible pump, sprinklers, root chamber, etc. • Explain the importance and process of disinfecting the root chambers with the use of relevant disinfectant. • Explain the importance and process of maintaining the recommended temperature and humidity in the root chamber and recommended quantity of various nutrients in the nutrient spray solution. • List the signs of rotting, wilting, pests 	<ul style="list-style-type: none"> • Demonstrate how to prepare the root chamber for growing plants. • Demonstrate the process of setting up a reservoir to store the nutrient spray solution. • Demonstrate the process of installing a submersible pump and PVC pipes to deliver nutrient spray solution to the sprinklers. • Demonstrate the process of installing sprinkler heads for spraying the nutrient spray solution on plants. • Show how to prepare the nutrient solution maintaining the recommended ratio of water, nutrients and hormones required for the growth of selected plants. • Show how to fill in the reservoir with the nutrient spray solution in the recommended quantity. • Demonstrate the process of setting up an automatic controller to automate the release of nutrient spray solution. • Show how to test the automatic controller to ensure it triggers the spray at the set interval of time. • Show how to place the vegetative cuttings on the top of the growing chamber maintaining the stems of the plants in the root chamber. • Demonstrate the process of carrying

<p>and disease in plants.</p> <ul style="list-style-type: none"> • Explain the benefits of resource optimisation. 	<p>out regular repair and maintenance.</p> <ul style="list-style-type: none"> • Demonstrate the process of applying the recommended disinfectant such as Hydrogen peroxide in the root chambers at appropriate intervals to prevent contamination. • Demonstrate the process of applying the appropriate treatment to treat rotting, wilting, pests and disease. • Prepare a sample record of any treatments and disinfectants used in the aeroponic farm. • Demonstrate various practices to optimise the usage of various resources such as water and electricity.
Classroom Aids	
Training Kit (Trainer Guide, Presentations). Whiteboard, Marker, Projector, Laptop	
Tools, Equipment and Other Requirements	
Calibrated Containers and Plates to Measure Run Off (Water), Different Types of Media Samples (Coco Peat, Perlite, Vermiculite, Rock Wool, Etc.)	

Module 13: Process of carrying out harvesting, post-harvest management and marketing activities

Mapped to AGR/N0823 v2.0

Terminal Outcomes:

- Demonstrate the process of carrying out harvesting activities.
- Demonstrate the process of performing post-harvest management.
- Describe the process of marketing the produce.

Duration: 15:00	Duration: 15:00
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> • Explain the relevant government schemes with the provision of subsidies for the promotion and marketing of hydroponic farming. • State the relevant state units and other financial institutions to be approached to avail the relevant government schemes. • State the appropriate marketing channels for selling the produce from hydroponic farms, and their constraints. • Describe the applicable procedures used for harvesting, storage, and logistics. • State the applicable harvesting schedules and techniques. • Explain the relevant aeration techniques. • State the applicable packaging techniques and labelling requirements. • List the signs of maturity in different types of crops and plants. • Explain the use of the relevant tools, equipment and accessories for harvesting and collecting the produce. • State the recommended practices to protect the produce from damage and contamination. 	<ul style="list-style-type: none"> • Demonstrate the process of carrying out harvesting using the relevant tools and implements. • Demonstrate the process of carrying out sorting and grading on the basis of applicable parameters. • Show how to tag the harvested plants/ crop for identification. • Prepare a sample record of the harvesting schedule and period of cultivation of crops/plants. • Demonstrate the use of humidity monitors to monitor the humidity. • Show how to pack the produce in the appropriate packing material and label it with the relevant information. • Demonstrate how to process the payment using the buyer-preferred e-payment method. • Prepare a sample manual and/ or electronic record of sales and payments using the physical registers and/ or the relevant computer system.

<ul style="list-style-type: none"> • Explain the relevant parameters to sort and grade the harvested produce on. • Explain the importance of storing the harvested produce under the recommended temperature, humidity and hygienic conditions. • Explain how to identify, connect and negotiate with potential buyers. • State the appropriate material to pack the produce and the relevant labelling requirements. • Explain the importance of maintaining the record of sales and payments. • Explain basic accounting practices such as calculating the expenditure and cost of production, and benefit-cost (B:C) ratio, etc. 	
Classroom Aids	
Training Kit (Trainer Guide, Presentations). Whiteboard, Marker, Projector, Laptop	
Tools, Equipment and Other Requirements	
NA	

Module 14: Preparation for plant tissue culture

Mapped to AGR/N8102 v2.0

Terminal Outcomes:

- Describe the process of preparing the lab and lab equipment for plant tissue culture.
- Demonstrate the process of preparing, sterilising and storing the plant tissue culture medium.

Duration: 15:00	Duration: 15:00
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> • Explain the importance of carrying out plant tissue culture. • List various lab equipment and Personal Protective Equipment (PPE) required for plant tissue culture. • Explain the importance of sterilising the lab and lab equipment. • Describe the process of disposing expired chemicals and solutions safely. • Describe the process of calibrating and maintaining various lab equipment. • Explain the importance of carrying out regular maintenance of lab equipment. • Describe basic lab inventory management practices. • List different types of culture medium used in plant tissue culture and the ingredients used to prepare them. • Describe the process of identifying the appropriate culture medium along with its nature, composition, and suitability for the different types of explants. • Describe the process of preparing the culture medium. • Explain the process of adjusting the plant tissue culture medium's Potential of Hydrogen (pH). • Describe the process of sterilising and storing the culture medium. 	<ul style="list-style-type: none"> • Demonstrate the process of sterilising the lab and lab equipment. • Demonstrate the use of relevant PPE. • Show how to calibrate various lab equipment according to the tolerance prescribed by the manufacturer. • Prepare a sample record regarding the performance, faults, repair, and annual maintenance of lab equipment. • Demonstrate the process of preparing different stock solutions as the nutrient medium with the required constituents, strength, and volume. • Demonstrate the process of different types of culture medium such as MS, B5, N6, Nitsch, and Whites. • Show how to dispense medium uniformly into culture bottles/ tubes manually or with the help of an automatic media dispenser. • Prepare a sample record of prepared culture medium in the media register or relevant computer system. • Show how to sterilise the media at the prescribed temperature and pressure. • Demonstrate the process of carrying out filtration sterilisation of the stock solutions through a syntax filter. • Show how to check the culture medium for microbial contamination after autoclaving.
Classroom Aids	
Training kit (Trainer guide, Presentations). Whiteboard, Marker, projector, laptop	
Tools, Equipment and Other Requirements	

Blotting paper, trays/paper dishes, labels, plastic bag, pipettes, burettes, and volumetric glassware, laminar airflow, spirit lamp, inoculation loops, incubators, Autoclave, chemicals/media/ reagent, Refrigerator.

Module 15: Propagation of plants through plant tissue culture

Mapped to ARG/N8103 v2.0

Terminal Outcomes:

- Describe the process of preparing the mother plant and explant and transferring the explant to the culture medium.
- Demonstrate the process of preparing the mother plant and explant, and transferring the explant to the culture medium.
- Demonstrate the process of acclimatising the tissue cultured plants.

Duration: 20:00	Duration: 40:00
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> • List different types of crops, fruits and vegetables suitable for plant propagation. • Explain the criteria for selecting a mother plant. • Describe the process of pre-treating and preparing the mother plant to extract explants. • Describe the various techniques in plant tissue culture and their applications. • Explain the process of extracting explant from the sterilised mother plant. • Describe the process of preparing and transferring an explant to the culture medium. • Describe the importance and process of acclimatising cultured plants. 	<ul style="list-style-type: none"> • Demonstrate the process of pre-treating the mother plant using the recommended fungicides to prevent bacterial contamination. • Demonstrate the use of relevant tools to extract explant from the mother plant. • Show how to sterilise the explant using the prescribed sterilisation solution and transfer it into the culture medium using sterilised forceps. • Show how to sterilise the relevant equipment and containers using an alcohol-based disinfectant. • Demonstrate the process of applying the necessary treatment to resolve any issues with root development. • Prepare a sample record of observations in the physical register or the relevant computer application. • Demonstrate the process of planting the tissue cultured plants in micro-pots filled with soil/ soilrite/ sand for primary hardening. • Demonstrate the process of transferring the plants to larger pots for secondary hardening after they develop new leaves and roots. • Show how to assess the growth of plantlets and detect the presence of any infections.
Classroom Aids	
Training kit (Trainer guide, Presentations). Whiteboard, Marker, projector, laptop	

Tools, Equipment and Other Requirements

Labware, cardboard boxes, part of the plant to be used, chemicals, Microscope, Laminar air flow, disinfectants, Parafilm/cotton plug, greenhouse or shade net

Module 16: Transplantation of the tissue cultured plants and record-keeping

Mapped to AGR/N8115 v1.0

Terminal Outcomes:

- Describe the process of transplanting the tissue cultured plants.
- Demonstrate the process of transplanting the tissue cultured plants.

Duration: 10:00	Duration: 20:00
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> • Describe the method of transplanting the tissue cultured plants in an open space or greenhouse. • List various materials required for transplanting tissue cultured plants. • Identify the appropriate conditions for transplanting the acclimatised and established plants to larger pots or greenhouse conditions. • Describe various practices for protecting the transplanted plants • Describe the process of applying the necessary treatment on plants showing signs of wilting, pests and disease. 	<ul style="list-style-type: none"> • Show how to prepare the plantingbed in a greenhouse for transplantingthe tissue cultured plants. • Show how to extract the plants from the pots ensuring no damage to plants and their roots. • Demonstrate the process of applying necessary treatment if the transplanted plants show signs of wilting, pests and disease. • Show how to use the relevant computer application to maintain the record of lab operations in the prescribed format.
Classroom Aids	
Training kit (Trainer guide, Presentations)	
Tools, Equipment and Other Requirements	
Disinfectants, Parafilm /cotton plug, greenhouse or shade net, labware, refrigerator, chemicals/ reagents, antiseptic liquids, first aid kit, fire extinguisher	

Module 17: Setting up a Nursery under Protected Cultivation

Mapped to NOS AGR/N1011 v1.0

Terminal Outcomes:

- Evaluate site for establishment of Hi-tech nursery
- Prepare growth media
- Prepare nursery bed

Duration: 7:00	Duration: 10:00
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> • Describe site conditions suitable for Hi-tech nursery. • Describe methods used in Hi-tech nursery for growing healthy seedlings and saplings. • Describe the environment and climatic control needed for nursery plants under protected cultivation. • Explain the importance of planning and calendaring nursery operations • Describe considerations for selection and preparation of soil and soil-less media. • Explain the basic principles of plant physiology – photosynthesis, respiration, water relations, transpiration, seedling and plant nutrition, growth and development. • Explain best practices for sourcing/organizing seeds, seedlings, compost/manure and other related resources. • Explain the need of the office/store house for keeping all registers, notebooks, information books 	<ul style="list-style-type: none"> • Prepare a checklist to evaluate site for suitability for Hi-tech nursery establishment. • Identify the tools and implements required for various nursery operations. • Use the tools and implements safely for various nursery operations • Perform measurements to plan the space allocation for nursery establishment • Demonstrate the preparation and treatment of soil and soilless media for seedlings as per the type of crop/plants/flowers to be grown. • Check the growth media mixture for the desired yield of the crop. • Demonstrate the preparation of nursery beds according to the crop/fruit/flower. • Demonstrate sowing techniques used in the nursery bed.
Classroom Aids:	
Computer, Projection Equipment, PowerPoint Presentation and software, Facilitator's Guide, Participant's Handbook	
Tools, Equipment and Other Requirements	
Walk-in natural ventilation polyhouse; various types of seeds, seedlings, cuttings; seedling tray; seed boxes; trowel; rake; hoe; polybags; pots of various sizes and materials; jute balls; shade nets; hand cutter; long cutter; digging fork; trowel; secateurs; budding or grafting knife; watering can	

Module 18: Nurturing Seedlings under Protected Cultivation

Mapped to NOS AGR/N1011 v1.0

Terminal Outcomes:

- Nurture the plants in the nursery

Duration: 15:00	Duration: 25:00
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> • Explain the need for hardening, root pruning, tip pruning and transplantation as well as their process and precautions. • List various pests, diseases and disorders in seedlings and their symptoms. • Explain the basic principles of integrated pest management. • Explain how to recognise nutritional deficiency/excess. • Describe chemical, biological and cultural methods and treatments available for seedlings health and protection. • Describe various irrigation and nutrition management procedures used in hi-tech nurseries. 	<ul style="list-style-type: none"> • Demonstrate the process for hardening of nursery plants by adjusting and acclimatizing the environment of the protected cultivation structure. • Demonstrate pruning of seedlings. • Demonstrate transplantation of seedlings and cuttings. • Demonstrate the irrigation procedures used in hi-tech nurseries. • Demonstrate nutrition management procedures in hi-tech nurseries. • Demonstrate infestation control procedures as per the need and crop requirements.
Classroom Aids:	
Computer, Projection Equipment, PowerPoint Presentation and software, Facilitator's Guide, Participant's Handbook	
Tools, Equipment and Other Requirements	
Various types of seeds, seedlings, cuttings; seedling tray; trowel; rake; polybags; pots of various sizes and materials; jute balls; shade nets; hand cutter; long cutter; watering can; sprinkler system, drip irrigation system; fertilizers for garden plants; shade net; greenhouse/shade house; shears; long cutters; cutters; hedge cutters; loppers; wheel barrow; secateurs; pruning saws; powered hedge trimmers; compost basket; compost pit; compost testing equipment; hand gloves; masks; pair of boots; apron	

Module 19: Nursery Operations and Harvesting

Mapped to NOS AGR/N1011 v1.0

Terminal Outcomes:

- Maintain area and tools
- Maintain records and labels
- Harvest the seedlings

Duration: 08:00	Duration: 25:00
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> • Describe various operations carried out in the nursery. • Describe measures for protecting the nursery from theft and environmental threats. • Explain the need and process of labelling the seedlings. • List the tools, implements and powered and non-powered machinery used in nursery management measures. • Explain the inventory management process for a nursery. • Describe the correct use, maintenance and storage of equipment and materials. • Describe the seedling display considerations. • Describe the harvesting and packaging consideration for seedlings. 	<ul style="list-style-type: none"> • Demonstrate the process for hardening the nursery plants by adjusting and acclimatizing the environment of the protected cultivation structure. • Prepare sample records pertaining to mother plants, progeny, stock of plants etc. as per the standard work practices. • Demonstrate labelling of the plants as per the standard working procedures. • Demonstrate the harvesting of the seedlings for transplantation/sale. • Demonstrate the packing of the plants properly in a polybag/container.
Classroom Aids:	
Computer, Projection Equipment, PowerPoint Presentation and software, Facilitator's Guide, Participant's Handbook	
Tools, Equipment and Other Requirements	
Accounting registers; sales registers; inventory registers; seedling packing materials; various types of pots, polybag containers, shovel, hoe, cutters	

Module 20: Preparation for floriculture under protected cultivation

Mapped to NOS AGR/N1013 v1.0

Terminal Outcomes:

- Select crop and protected cultivation structure
- Prepare medium for plantation

Duration: 06:00	Duration: 12:00
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> • State the advantages of growing flower crops under protected condition • Describe the favourable conditions required for flower cultivation under protected structures • List the major flower crops and their varieties that are commercially grown under protected condition • Describe the types of protected structures used for growing various flower crops • Explain the systems/technology for providing favourable environmental or growth conditions with respect to light intensity, temperature, humidity and oxygen/carbon dioxide levels • Describe the growing systems for flower crops under protected condition including hydroponics and aeroponics system • Explain the soil and soilless growing media, their composition, characteristics and selection criteria • Describe the agricultural practices to prepare the growing media as per the requirement of the crop such as tillage, bed preparation, fumigation, mulching, manuring, residue incorporation, adding nutrients, etc. 	<ul style="list-style-type: none"> • Demonstrate the process of assessment and adjustment of the environmental conditions within the protected structure, based on the requirement of the flower crop. • Select appropriate growth media for flower crop such as soil, soilless substrates, other media or substrates such as coco peat, vermiculite, perlite, rock wool, sand, rice husk, bark, sphagnum peat moss and saw dust. • Demonstrate the method of decontaminating the media, such as chemical drenching/ fumigation, steaming, pasteurization and solarization. • Demonstrate the method of preparation of soil and soilless media. • Demonstrate preparation of flat planting bed.
Classroom Aids:	
Computer, Projection Equipment, PowerPoint Presentation and software, Facilitator's Guide, Participant's Handbook	
Tools, Equipment and Other Requirements	

Walk-in natural ventilation polyhouse; Soil and soilless substrates; digger; spade; hoe; mulching materials; watering can

Module 21: Planting a Flower Crop

Mapped to NOS AGR/N1013 v1.0

Terminal Outcomes:

- Plant a flower crop under protected cultivation

Duration: 08:00	Duration: 16:00
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> Describe the types of planting materials used for flower crop cultivation and their treatment. Describe the soil and soilless planting practices used for common and commercially viable flower crops 	<ul style="list-style-type: none"> Select suitable planting material for flower crop such as seed, seedlings raised in nurseries, tissue cultured plantlets, etc. Demonstrate the cleaning and preparation of the planting material Demonstrate the propagation method for the flower crop such as shield or T-budding, stenting method, cuttings, micro-propagation. Demonstrate planting of the planting material at the right time ensuring optimum planting density.
Classroom Aids:	
Computer, Projection Equipment, PowerPoint Presentation and software, Facilitator's Guide, Participant's Handbook	
Tools, Equipment and Other Requirements	
Walk-in natural ventilation polyhouse; Soil and soilless substrates; Flower planting material for rose, gerbera, carnation, anthurium, liliun, orchids, chrysanthemum; seedling tray; seed boxes; trowel; rake; hoe; stakes; hand cutter; long cutter; digging fork; trowel; secateurs; watering can; mulching materials	

Module 22: Nurturing a Flower Crop

Mapped to NOS AGR/N1013 v1.0

Terminal Outcomes:

- Manage irrigation water and soil nutrients
- Prevent and control weeds, pests and diseases

Duration: 08:00	Duration: 16:00
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> • Describe the growth regulation practices used for common flower crops, their purpose, tools and correct procedures • Describe nutrition management of flower crops under protected cultivation. • Describe irrigation management of flower crops under protected condition. • Describe drainage systems and techniques used for growing flower crops under different types of protected structures. • Describe pests, weeds and diseases in flower crops and their symptoms, prevention and control procedures • Describe the practices of crop rotation with legumes, inter-cropping and barrier cropping • Explain the importance of ensuring good quality of filtered water for flower crop. 	<ul style="list-style-type: none"> • Prepare a sample daily/weekly irrigation and fertigation schedule as per the requirement of the crop. • Demonstrate micro-irrigation technique including use of fertigation, spraying system, use of exhaust fan and cooling pads, shading net as per flower crop, stage of growth, type of protected cultivation structure and availability of water • Demonstrate application of appropriate dose of manure fertilizer as per the crop requirement. • Apply micro-nutrients by foliar spray • Demonstrate technique used to promote the growth of auxiliary buds and lateral branches. • Demonstrate various plant management practices such as centring (or decentring), trimming, pruning, pinching, disbudding, de-shooting, defoliation, removal of faded flowers and bending of shoots as required. • Identify symptoms of disease, infestation, disorder and damage in the sample flower crop. • Demonstrate application of appropriate measures for prevention and treatment of disease, infestation, disorder and damage to the sample flower crop.
Classroom Aids:	
Computer, Projection Equipment, PowerPoint Presentation and software, Facilitator's Guide, Participant's Handbook	
Tools, Equipment and Other Requirements	

Module 23: Harvesting a Flower Crop

Mapped to NOS AGR/N1013 v1.0

Terminal Outcomes:

- Harvest a flower crop under protected cultivation

Duration: 08:00	Duration: 16:00
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> Describe the harvesting practices used for flower crops that ensure maximum yield. Identify market requirement for commercial flowers in terms of stage of harvest, stem length, bud size, quality and quantity of produce, type of packaging, etc. Explain the need to harvest the flowers as per the market requirement. Describe sorting and grading methods and considerations of flower crop. Explain the need to arrange for buyers for the segregated produce which are not meeting the quality standards. State the precautions and methods of temporary storage of the produce. Describe records required for harvest and post-harvest activities. Describe packing methods, processes and materials used for the harvested flowers. Describe safe storage, loading, unloading and stacking techniques of the marketable produce. Describe various opportunities for marketing and selling the produce. 	<ul style="list-style-type: none"> Demonstrate harvesting practices for loose and cut flowers. Demonstrate temporary storage of the flower produce post-harvest. Use weighing machines to weigh the harvested produce accurately. Demonstrate sorting and grading of the harvested produce based on quality, color and size. Demonstrate packaging, storage and transport of the marketable produce, ensuring that the produce remains fresh and damage free for a long time. Prepare the sample records required for the harvest and post-harvest activities.
Classroom Aids:	
Computer, Projection Equipment, PowerPoint Presentation and software, Facilitator's Guide, Participant's Handbook	
Tools, Equipment and Other Requirements	
Harvester, weighing machine, sealing machine, packing materials, storage containers	

Module 24: Basic entrepreneurial activities for small enterprise

Mapped to AGR/N9908 v2.0

- Describe the process of planning the agricultural enterprise/ business.
- Describe the process of managing the agricultural production process.
- Describe the process of managing the post-production and marketing processes.

Duration: 20:00	Duration: 10:00
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> • Explain how to analyse the demand and supply of the relevant agricultural produce in the market • Describe the process of identifying the target customers and assess their needs and expectations with respect to the quality and price of the produce. • Explain how to identify various types of agricultural entrepreneurship/ business opportunities. • Explain how to prepare a basic business plan for agricultural entrepreneurship/business activities. • State the appropriate sources of funding for the agricultural entrepreneurship/ businesses • State the relevant government schemes and programs • Explain the importance of ensuring compliance with the government structural reforms and • framework, along with the applicable rules and regulations. • List various resources required for agricultural production • Describe the process of planning agricultural production and the use of relevant technologies to enhance production • Explain the importance of ensuring no cause adverse impact on the environment and produce during production 	<ul style="list-style-type: none"> • Demonstrate how to analyse the demand and supply of the relevant agricultural produce in the market. • Prepare a sample basic business plan for agricultural entrepreneurship/business activities. • Demonstrate how to calculate the costs incurred and determine the price of the product for profitability. • Prepare a sample marketing plan considering the 4Ps i.e., product, price, promotion, and place and 4As i.e., acceptability, affordability, accessibility, and awareness. • Demonstrate the process of using the relevant digital services such as e-commerce, e-payments, electronic recordkeeping, etc.

- State the recommended practices to be followed for efficient input resource management.
- Describe the process of optimising the production processes and output through the amalgamation of existing practices with smart technologies.
- Explain the recommended sustainability practices to be followed during agricultural production to prevent and deal with deforestation, loss of biodiversity, soil degradation, etc.
- Explain how to collect information related to the wholesale and retail price of agricultural produce.
- Explain how to calculate the economics of the produce viz. production cost, price of the produce, B:C Ratio etc.
- Explain the relevant government schemes with the provision of subsidies/funds for the promotion of agricultural produce.
- Describe the process of selecting appropriate marketing channels for marketing agricultural produce, and the applicable requirements and constraints.
- List the relevant buyers of different types of agricultural produce.
- Explain how to identify and manage various risks to production and post-production processes.
- Explain how to undertake outreach programs to promote agricultural products and services, and expand agri-business.
- Explain the 4Ps i.e., product, price, promotion, and place and 4As i.e., acceptability, affordability, accessibility, and awareness considered while preparing and executing a marketing plan.
- Explain the use of the relevant digital services such as e-commerce, e-payments, electronic recordkeeping,

<p>etc.</p> <ul style="list-style-type: none"> • Explain the importance of using efficient post-production logistics. • Explain the importance of maintaining various records accurately. 	
Classroom Aids	
Training Kit (Trainer Guide, Presentations). Whiteboard, Marker, Projector, Laptop	
Tools, Equipment and Other Requirements	
NA	

Module 25: Hygiene and cleanliness

Mapped to NOS AGR/N9903 v3.0

Terminal Outcomes:

- Discuss how to adhere to personal hygiene practices.
- Demonstrate ways to ensure cleanliness around the workplace.

Duration: 02:00	Duration: 10:00
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> • Explain the requirements of personal health, hygiene and fitness at work. • Describe common health-related guidelines laid down by the organizations/ Government at the workplace • Explain the importance of good housekeeping at the workplace. • Explain the importance of informing the designated authority on personal health issues related to injuries and infectious diseases. 	<ul style="list-style-type: none"> • Demonstrate personal hygiene practices to be followed at the workplace. • Demonstrate the correct way of washing hands using soap and water, and alcohol-based hand rubs. • Demonstrate the steps to follow to put on and take off a mask safely. • Show how to sanitize and disinfect one's work area regularly. • Demonstrate adherence to workplace sanitization norms. • Show how to ensure the cleanliness of the work area.
Classroom Aids:	
Computer, Projection Equipment, PowerPoint Presentation and Software, Facilitator's Guide, Participant's Handbook.	
Tools, Equipment and Other Requirements	
Personal Protective Equipment, Cleaning Equipment and Materials, Sanitizer, Soap, Mask	

Module 26: Safety and emergency procedures

Mapped to NOS AGR/N9903 v3.0

Terminal Outcomes:

- Describe how to adhere to safety guidelines.
- Show how to administer appropriate emergency procedures.

Duration: 03:00	Duration: 15:00
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> • List the Personal Protective Equipment (PPE) required at the workplace. • Describe the commonly reported hazards at the workplace. • Describe the hazards caused due to chemicals/pesticides/fumigants. • Describe the basic safety checks to be done before the operation of any equipment/machinery. • Describe the common first aid procedures to be followed in case of emergencies. • State measures that can be taken to prevent accidents and damage s at the workplace. • Explain the importance of reporting details of first aid administered, to the reporting officer/doctor, in accordance with workplace procedures • State common health and safety guidelines to be followed at the workplace. 	<ul style="list-style-type: none"> • Check various areas of the workplace for leakages, water-logging, pests, fire, etc. • Demonstrate how to safely use the PPE and implement it as applicable to the workplace. • Display the correct way of donning, doffing and discarding PPE such as face masks, hand gloves, face shields, PPE suits, etc. • Sanitize the tools, equipment and machinery properly. • Demonstrate the safe disposal of waste. • Demonstrate procedures for dealing with accidents, fires and emergencies. • Demonstrate emergency procedures to the given workplace requirements. • Demonstrate the use of emergency equipment in accordance with manufacturers' specifications and workplace requirements. • Demonstrate the administration of first aid. • Prepare a list of relevant hotline/emergency numbers
Classroom Aids:	
Computer, Projection Equipment, PowerPoint Presentation and Software, Facilitator's Guide, Participant's Handbook.	
Tools, Equipment and Other Requirements	
Personal Protective Equipment, First Aid Kit, Equipment used in Medical Emergencies.	

Module 27: Employability Skills

Mapped to NOS DGT/VSQ/N0102 v1.0

Duration: 60:00

Key Learning Outcomes

Introduction to Employability Skills Duration: 1.5 Hours

After completing this programme, participants will be able to:

1. Discuss the Employability Skills required for jobs in various industries
2. List different learning and employability related GOI and private portals and their usage

Constitutional values - Citizenship Duration: 1.5 Hours

3. Explain the constitutional values, including civic rights and duties, citizenship, responsibility towards society and personal values and ethics such as honesty, integrity, caring and respecting others that are required to become a responsible citizen
4. Show how to practice different environmentally sustainable practices.

Becoming a Professional in the 21st Century Duration: 2.5 Hours

5. Discuss importance of relevant 21st century skills.
6. Exhibit 21st century skills like Self-Awareness, Behavior Skills, time management, critical and adaptive thinking, problem-solving, creative thinking, social and cultural awareness, emotional awareness, learning to learn etc. in personal or professional life.
7. Describe the benefits of continuous learning.

Basic English Skills Duration: 10 Hours

8. Show how to use basic English sentences for everyday conversation in different contexts, in person and over the telephone
9. Read and interpret text written in basic English
10. Write a short note/paragraph / letter/e -mail using basic English

Career Development & Goal Setting Duration: 2 Hours

11. Create a career development plan with well-defined short- and long-term goals

Communication Skills Duration: 5 Hours

12. Demonstrate how to communicate effectively using verbal and nonverbal communication etiquette.
13. Explain the importance of active listening for effective communication
14. Discuss the significance of working collaboratively with others in a team

Diversity & Inclusion Duration: 2.5 Hours

15. Demonstrate how to behave, communicate, and conduct oneself appropriately with all genders and PwD
16. Discuss the significance of escalating sexual harassment issues as per POSH act.

Financial and Legal Literacy Duration: 5 Hours

17. Outline the importance of selecting the right financial institution, product, and service
18. Demonstrate how to carry out offline and online financial transactions, safely and securely
19. List the common components of salary and compute income, expenditure, taxes, investments etc.
20. Discuss the legal rights, laws, and aids

Essential Digital Skills Duration: 10 Hours

21. Describe the role of digital technology in today's life
22. Demonstrate how to operate digital devices and use the associated applications and features, safely and securely
23. Discuss the significance of displaying responsible online behavior while browsing, using various social media platforms, e-mails, etc., safely and securely
24. Create sample word documents, excel sheets and presentations using basic features
25. utilize virtual collaboration tools to work effectively

Entrepreneurship Duration: 7 Hours

26. Explain the types of entrepreneurship and enterprises
27. Discuss how to identify opportunities for potential business, sources of funding and associated financial and legal risks with its mitigation plan
28. Describe the 4Ps of Marketing-Product, Price, Place and Promotion and apply them as per requirement
29. Create a sample business plan, for the selected business opportunity

Customer Service Duration: 5 Hours

30. Describe the significance of analyzing different types and needs of customers
31. Explain the significance of identifying customer needs and responding to them in a professional manner.
32. Discuss the significance of maintaining hygiene and dressing appropriately

Getting Ready for apprenticeship & Jobs Duration: 8 Hours

33. Create a professional Curriculum Vitae (CV)
34. Use various offline and online job search sources such as employment exchanges, recruitment agencies, and job portals respectively
35. Discuss the significance of maintaining hygiene and confidence during an interview
36. Perform a mock interview
- 37. List the steps for searching and registering for apprenticeship opportunities**

Annexure

Trainer Requirements

Trainer Prerequisites						
Minimum Educational Qualification	Specialization	Relevant Experience		Training Experience		Remarks
		Years	Specialization	Years	Specialization	
Diploma	Agriculture/Horticulture	3	Experience required in Horticulture and related field	0		Ex-Service-Man including Ex-Paramilitary personnel: Minimum Qualification is 10+2 with an Honourable Discharge/Pension. SSC would consider a relaxation/waiver of sector specific experience on case to case basis.
Graduate	Agriculture/Horticulture	2	Experience required in Horticulture and related field	0		
Graduate	Agriculture / Horticulture / Botany / Forestry	1	Experience required in Horticulture and related field	0		
Post Graduate	Agronomy / Horticulture / Floriculture / Soil science / Botany / Plant Breeding / Biotechnology	0.5	Experience required in Horticulture and related field			

Trainer Certification	
Domain Certification	Platform Certification
Certified for Qualification “ Professional Gardening and Nursery Management ”, mapped to QP: “AGR/Q0815, v1.0”, Minimum accepted score is 80%	Recommended that the Trainer is certified for the Job Role: “Trainer (Vet and Skills)”, mapped to the Qualification Pack: “MEP/Q2601, v2.0”. The minimum accepted score as per MEPSC guidelines is 80%.

Assessor Requirements

Assessor Prerequisites						
Minimum Educational Qualification	Specialization	Relevant Industry Experience		Training/Assessment Experience		Remarks
		Years	Specialization	Years	Specialization	
Graduation	B.Sc (Agriculture/ Botany/ Forestry/ Horticulture/ Floriculture and related streams)	5	Agriculture/ Forestry/ Horticulture and related experience	0		Practical skills and knowledge required in the care and management of garden & nursery operations
Post-graduation	M.Sc (Agronomy/ Botany/ Forestry/ Horticulture/ Floriculture and related streams)	2	Agriculture/ Forestry/ Horticulture and related experience	0		Practical skills and knowledge required in the care and management of garden & nursery operations
PhD	Agronomy/ Botany/ Forestry/ Horticulture/ Floriculture and related streams	1	Agriculture/ Forestry/ Horticulture and related experience	0		Practical skills and knowledge required in the care and management of garden & nursery operations

Assessor Certification	
Domain Certification	Platform Certification
Certified for Qualification “ Professional Gardening and Nursery Management ”, mapped to QP: “AGR/Q0815, v1.0”, Minimum accepted score is 80%	Certified for the Job Role: “Assessor (Vet and Skills)”, mapped to the Qualification Pack: “MEP/Q2701, v2.0”, with a minimum score of 80%.

Assessment Strategy

Assessment System Overview

In Agriculture Sector it is of ultimate importance that individuals dealing with crop production or livestock have the requisite knowledge and competencies to undertake the task. Based on the Assessment Criteria, SSC in association with empaneled AAs, define the test structure for the given job roles to cover the required skills and competencies. Assessment strategy consists of the following:

1. Multiple Choice Questions: To assess basic knowledge (Objective/Subjective)
2. Viva: To assess awareness on processes (Oral and/or written questioning)
3. Practical: To evaluate skills and identify competencies. (Observation)

Assessments for knowledge and awareness on processes may be conducted through 'real-time' internet-based evaluation or by conducting the same 'offline' through TABs. Skills and competencies are to be assessed by conducting 'practical' on the ground through qualified and ToA certified assessors.

An individual must have adequate knowledge and skills to perform a specific task, weightage for different aspects of the assessment is given as follows:

- Multiple Choice Questions: 20%-30%, depending on the specific QP
- Viva: 20%
- Practical: 50% - 60% (Involves demonstrations of applications and presentations of procedures/tasks and other components)
- Assessment will be carried out by certified assessors through empaneled assessment partners. Based on the results of the assessment; ASCI will certify the learners/candidates

Testing Environment

Assessments are conducted on laptops, Mobiles and android tablets via both offline and online mode depending on the internet connectivity at the assessment location.

In remote locations/villages, assessments get delivered through tablets without the requirement of the Internet.

- Multilingual assessments (ASCI is conducting the assessments in 13 + languages pan India)
- Rubric driven assessments in Practical/Viva sections and responses recorded accordingly
- All responses, data, records and feedback stored digitally on the cloud
- Advanced auto-proctoring features – photographs, time-stamp, geographic-tagging, toggle- screen/copy-paste disabled, etc.
- Android-based monitoring system
- End to end process from allocation of a batch to final result upload, there is no manual intervention

- Assessment will normally be fixed for a day after the end date of the training / within 7 days of completion of training.
- Assessment will be conducted at the training venue
- The room where assessment is conducted will be set with proper seating arrangements with enough space to curb copying or other unethical activities
- Question bank of theory and practice will be prepared by ASCI /assessment agency and approved ASCI. Only from approved Question Bank assessment agency will prepare the question paper. Theory testing will include multiple-choice questions, pictorial questions, etc. which will test the trainee on his theoretical knowledge of the subject.
- The theory, practical and viva assessments will be carried out on the same day. In case of a greater number of candidates, the number of assessors and venue facilitation be increased and facilitated

Assessment			
Assessment Type	Formative or Summative	Strategies	Examples
Theory	Summative	MCQ/Written exam	Knowledge of facts related to the job role and functions. Understanding of principles and concepts related to the job role and functions
Practical	Summative	Structured tasks/Demonstration	Practical application /Demonstration /Application tasks
Viva	Summative	Questioning and Probing	Mock interviews on the usability of job roles/advantages /importance of adherence to procedures. Viva will be used to gauge trainee's confidence and correct knowledge in handling the job situation

The question paper pre-loaded in the computer /Tablet and it will be in the language as requested by the training partner.

Assessment Quality Assurance framework

Assessment Framework and Design:

Based on the Assessment Criteria, SSC in association with AAs will define the test structure for the given roles to cover the required skills and competencies. ASCI offer a bouquet of tools for multi-dimensional evaluation of candidates covering language, cognitive skills, behavioural traits and domain knowledge.

Theoretical Knowledge - Item constructs and types are determined by a theoretical understanding of the testing objectives and published research about the item types and constructs that have shown statistical validity towards measuring the construct. Test item types that have been reported to be coachable are not included. Based on these, items are developed by domain experts. They are provided with comprehensive guidelines of the testing objectives of each question and other quality measures.

Type – Questions based on Knowledge Required, Case-based practical scenario questions and automated simulation-based questions.

Practical Skills - The practical assessments are developed taking into consideration two aspects: what practical tasks is the candidate expected to perform on the job and what aspects of the job cannot be judged through theoretical assessments. The candidates shall be asked to perform either an entire task or a set of subtasks depending on the nature of the job role

Type – Standardized rubrics for evaluation against a set of tasks in a demo/practical task

Viva Voce - Those practical tasks which cannot be performed due to time or resource constraints are evaluated through the viva mode. Practical tasks are backed up with Viva for thorough assessment and complete evaluation

Type – Procedural questions, dos and don'ts, subjective questions to check the understanding of practical tasks.

The assessor has to go through an orientation program organized by the Assessment Agency. The training would give an overview to the assessors on the overall framework of QP evaluation. The assessor shall be given a NOS and PC level overview of each QP as applicable. The overall structure of assessment and objectivity of the marking scheme will be explained to them. The giving of marks will be driven by an objective framework that will maintain the standardization of the marking scheme.

Type of Evidence and Evidence Gathering Protocol:

During the assessment the evidence collected by AAs and ASCI are:

- GeoTagging to track ongoing assessment
- AA's coordinator emails the list of documents and evidence (photos and videos) to the assessor one day before the assessment. The list is mentioned below:
 - Signed Attendance sheet
 - Assessor feedback sheet

- Candidate feedback sheet
- Assessment checklist for assessor
- Candidate Aadhar/ID card verification
- Pictures of the classroom, labs to check the availability of adequate equipment's and tool to conduct the training and assessment
- Pictures and videos of Assessment, training feedback and infrastructure.
- Apart from the Assessor, a Technical assistant is popularly known as Proctor also ensures the proper documentation and they verify each other's tasks.
- To validate their work on the day of the assessment, regular calls and video calls are done.
- On-boarding and training of assessor and proctor is done on a timely basis to ensure that the quality of the assessment should be maintained.
- Training covers the understanding of QP, NSQF level, NOS and assessment structure

Methods of Validation

- Morning Check (Pre-Assessment): Backend team of AA calls and confirms assessor/technical SPOC event status. Assessor/Technical SPOC are instructed to reach the centre on time by 9:30 AM / as decided with TC and delay should be highlighted to the Training Partner in advance.
- Video Calls: Random video calls are made to the technical SPOC/assessor so as to keep a check on assessment quality and ensure assessment is carried out in a fair and transparent manner
- Aadhar verification of candidates
- Evening Check (Post Assessment): Calls are made to the ground team to ensure the event is over by what time and the documentation is done properly or not.
- TP Calling: To keep a check on malpractices, an independent audit team calls the TP on a recorded line to take confirmation if there was any malpractice activity observed in the assessment on part of the AA/SSC team. If calls are not connected, an email is sent to TP SPOC for taking their confirmation
- Video and Picture Evidence: Backend team collects video and pictures for assessment on a real-time basis and highlights any issue such as students sitting idle/ trainer helping the candidates during the assessment.
- Surprise Visit: Time to time SSC/AA Audit team can visit the assessment location and conduct a surprise audit for the assessment carried out by the ground team.
- Geo Tagging: On the day of the assessment, each technical SPOC is required to login into our internal app which is Geotagged. Any deviation with the centre address needs to be highlighted to the assessment team on a real-time basis.

Method for assessment documentation, archiving, and Access:

- ASCI have a fully automated result generation process in association with multiple AAs
- Theory, Practical and Viva marks form the basis of the results and encrypted files generated to avoid data manipulation. All responses were captured and stored in the

System with Time-Stamps at the end of AAs and SSC. NOS-wise and PC-wise scores can be generated.

- Maker Checker concept: One person prepares the results and another audit result which is internally approved by AA at first and then gets vetted at the end of SSC
- All softcopies of documents are received from the on-ground tech team over email. The same is downloaded by our internal backend team and saved in Repository. The repository consists of scheme-wise folders. These scheme-wise folders have two job role-specific folders. These specific folders have Year wise and Month wise folders where all documents are saved in Batch specific folders. All Hard copies are filed and stored in the storeroom.

Result Review & Recheck Mechanism –

- Time-stamped assessment logs
- Answer/Endorsement sheets for each candidate
- Attendance Sheet
- Feedback Forms: Assessor feedback form, Candidate feedback form, TP feedback form
- The results for each of the candidate shall be stored and available for review (retained for 5 years/ till the conclusion of the project or scheme)

References

Glossary

Term	Description
Declarative Knowledge	Declarative knowledge refers to facts, concepts and principles that need to be known and/or understood in order to accomplish a task or to solve a problem.
Key Learning Outcome	Key learning outcome is the statement of what a learner needs to know, understand and be able to do in order to achieve the terminal outcomes. A set of key learning outcomes will make up the training outcomes. Training outcome is specified in terms of knowledge, understanding (theory) and skills (practical application).
OJT (M)	On-the-job training (Mandatory); trainees are mandated to complete specified hours of training on site
OJT (R)	On-the-job training (Recommended); trainees are recommended the specified hours of training on site
Procedural Knowledge	Procedural knowledge addresses how to do something, or how to perform a task. It is the ability to work, or produce a tangible work output by applying cognitive, affective or psychomotor skills.
Training Outcome	Training outcome is a statement of what a learner will know, understand and be able to do upon the completion of the training.
Terminal Outcome	Terminal outcome is a statement of what a learner will know, understand and be able to do upon the completion of a module. A set of terminal outcomes help to achieve the training outcome.

Acronyms and Abbreviations

Term	Description
AGR	Agriculture
NOS	National Occupational Standard (s)
NSQF	National Skills Qualifications Framework
OJT	On-the-job Training
QP	Qualifications Pack
PwD	People with Disability
PPE	Personal Protective Equipment