Model Curriculum

QP Name: Horticulturist - Protected Cultivation (Electives: Nursery / Vegetables / Flowers)

QP Code: AGR/Q1004

QP Version: 2.0

NSQF Level: 5

Model Curriculum Version: 2.0

Agriculture Skill Council of India (ASCI)
6th Floor, GNG building, Plot No.10, Sector-44
Gurugram, Haryana -122004, India

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Training Parameters

Sector	AGRICULTURE AND ALLIED
Sub-Sector	Agriculture Crop Production
Occupation	Precision Farming
Country	India
NSQF Level	5
Aligned to NCO/ISCO/ISIC Code	NCO-2015/6113
Minimum Educational Qualification and Experience	Completed 2nd year of UG OR Pursuing 2nd year of UG and continuous education OR Completed 2nd year of diploma (after 12th) OR Pursuing 2nd year of 2-year diploma after 12th OR 12th pass with 1-year Vocational Education & training (NTC or NAC or CITS) OR Completed 3-year diploma after 10th with 1- year relevant experience OR 12th Grade pass with 2- year relevant experience OR 10th Grade pass with 4-year relevant experience OR Previous relevant Qualification of NSQF Level 4 and with minimum education as 8th Grade pass with 3-year relevant experience OR Previous relevant Qualification of NSQF Level 4.5 with 1.5- year relevant experience
Pre-Requisite License or Training	NA
Minimum Job Entry Age	18 years
Last Reviewed On	20/11/2020
Next Review Date	20/11/2025
NSQC Approval Date	25/02/2021

QP Version	2.0
Model Curriculum Creation Date	20/11/2020
Model Curriculum Valid Up to Date	20/11/2025
Model Curriculum Version	2.0
Minimum Duration of the Course	480 Hours
Maximum Duration of the Course	660 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.

- Install and commission the protected cultivation structure
- Maintain various types of protected cultivation structures
- Utilize the resources optimally in an eco-friendly manner
- Perform basic entrepreneurial activities for small enterprise
- Follow health, hygiene and safety measures at the workplace
- Set up and operate nursery under protected cultivation
- Carry out protected cultivation of vegetable crops
- Carry out protected cultivation of flower crops

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
Bridge Module	**05:00**	**00:00**	**00:00**	**00:00**	**05:00**
Module 1: Introduction to the horticulture sector and the job	05:00	00:00	00:00	00:00	05:00
AGR/N1009: Install and commission protected cultivation structure/s NOS Version 1.0 NSQF Level 5	**25:00**	**60:00**	**00:00**	**00:00**	**85:00**
Module 2: Protected Cultivation Fundamentals	05:00	05:00	00:00	00:00	10:00
Module 3: Preparation for Installation of Structure	05:00	15:00	00:00	00:00	20:00
Module 4: Installation of structure	10:00	30:00	00:00	00:00	40:00
Module 5: Commissioning of structure	05:00	10:00	00:00	00:00	15:00
AGR/N1010: Oversee the maintenance of the	**20:00**	**40:00**	**00:00**	**00:00**	**60:00**

NOS and Module Details					
protected cultivation structure/s **NOS Version 1.0** **NSQF Level 5**					
Module 6: Preparing for maintenance	04:00	08:00	00:00	00:00	12:00
Module 7: Maintenance of structure	12:00	24:00	00:00	00:00	36:00
Module 8: Optimum resource utilization	04:00	08:00	00:00	00:00	12:00
AGR/N9908: Undertake basic entrepreneurial activities for small enterprise **NOS Version 2.0** **NSQF Level 4**	**20:00**	**10:00**	**00:00**	**00:00**	**30:00**
Module 9: Basic entrepreneurial activities	20:00	10:00	00:00	00:00	30:00
AGR/N9903: Maintain health and safety at the workplace **NOS Version 3.0** **NSQF Level 4**	**20:00**	**10:00**	**00:00**	**00:00**	**30:00**
Module 10: Hygiene and Cleanliness	04:00	04:00	00:00	00:00	08:00
Module 11: Safety and emergency procedures	16:00	06:00	00:00	00:00	24:00
DGT/VSQ/N0103 **Employability Skills** **NOS Version-1.0** NSQF Level-5	90:00	00:00	0:00	0:00	90:00
Module 12: Employability Skills	90:00	00:00	0:00	0:00	90:00
Total Duration	**180:00**	**120:00**	**00:00**	**00:00**	**300:00**
OJT: 90 hours					

Elective Modules

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

Elective 1:

NOS and Module Details	Theory Duration	Practical Duration	On-the-Job Training Duration (Mandatory)	On-the-Job Training Duration (Recommended)	Total Duration

NOS and Module Details	Theory Duration	Practical Duration	On-the-Job Training Duration (Mandatory)	On-the-Job Training Duration (Recommended)	Total Duration
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 12: Setting up a nursery under protected Cultivation	07:00	10:00	00:00	00:00	17:00
Module 13: Nurturing seedlings under protected Cultivation	15:00	25:00	00:00	00:00	40:00
Module 14: Nursery operations and harvesting	08:00	25:00	00:00	00:00	33:00
Total Duration	**30:00**	**60:00**	**00:00**	**00:00**	**90:00**

Elective 2:

NOS and Module Details	Theory Duration	Practical Duration	On-the-Job Training Duration (Mandatory)	On-the-Job Training Duration (Recommended)	Total Duration
AGR/N1012: Carry out protected cultivation of vegetable crops NOS Version 1.0 NSQF Level 5	**30:00**	**60:00**	**00:00**	**00:00**	**90:00**
Module 15: Prepare for vegetable cultivation under protected cultivation	06:00	12:00	00:00	00:00	18:00
Module 16: Planting a vegetable crop	08:00	16:00	00:00	00:00	24:00
Module 17: Nurturing a vegetable crop	08:00	16:00	00:00	00:00	24:00
Module 18: Harvesting a vegetable crop	08:00	16:00	00:00	00:00	24:00
Total Duration	**30:00**	**60:00**	**00:00**	**00:00**	**90:00**

Elective 3:

NOS and Module Details	Theory Duration	Practical Duration	On-the-Job Training Duration (Mandatory)	On-the-Job Training Duration (Recommended)	Total Duration
AGR/N1013: Carry out protected cultivation of flower crops	**30:00**	**60:00**	**00:00**	**00:00**	**90:00**

NOS Version 1.0 NSQF Level 5					
Module 19: Preparing for flower cultivation under protected cultivation	06:00	12:00	00:00	00:00	18:00
Module 20: Planting a flower crop	08:00	16:00	00:00	00:00	24:00
Module 21: Nurturing a flower crop	08:00	16:00	00:00	00:00	24:00
Module 22: Harvesting a flower crop	08:00	16:00	00:00	00:00	24:00
Total Duration	**30:00**	**60:00**	**00:00**	**00:00**	**90:00**

Module Details

Module 1: Introduction to the horticulture sector and the job
Bridge Module

Terminal Outcomes:

- Describe the industry and sub-sector
- List the career options and key responsibilities of a Horticulturist-Protected Cultivation

Duration: *05:00*	**Duration**: *00:00*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
- Provide a brief overview of the agriculture industry and the horticulture sub-sector. - State the career growth opportunities within the protected cultivation segment. - List the key responsibilities of a Horticulturist-Protected Cultivation.	
Classroom Aids:	
Computer, Projection Equipment, PowerPoint Presentation and software, Facilitator's Guide, Participant's Handbook	
Tools, Equipment and Other Requirements	
Nil	

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& ENTREPRENEURSHIP

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Module 2: Fundamentals of Protected Cultivation
Mapped to NOS AGR/N1009 v1.0

Terminal Outcomes:

- Describe the protected cultivation segment of the agriculture industry
- Describe the types of protected cultivation structures and technologies

Duration: *05:00*	**Duration**: *05:00*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
- Explain the need for protected cultivation. - Discuss the current trends in the protected cultivation segment of the horticulture industry. - List the plants grown under protected cultivation. - Describe the types of protected cultivation structures, their advantages, disadvantages and applications - List the major components of a protected cultivation structure. - Describe the various types of environmental control measures and technology used for cooling, heating, humidification, fertigation, lighting, enriching gaseous composition, irrigation, fogging, pesticide spraying, etc. - List the Government schemes for protected cultivation and their benefits.	
Classroom Aids:	
Computer, Projection Equipment, PowerPoint Presentation and software, Facilitator's Guide, Participant's Handbook	
Tools, Equipment and Other Requirements	
Sample walk-in tunnels, natural ventilation greenhouses, poly cum shade house, poly tunnel	

Module 3: Preparation for installation of protected cultivation structure
Mapped to NOS AGR/N1009 v1.0

Terminal Outcomes:

- Perform pre-installation checks and procedures
- Prepare the materials, equipment and area
- Plan for the installation and commissioning

Duration: *05:00*	**Duration**: *15:00*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
- State the various pre-installation procedures required for the erection of protected structures. - Describe the considerations for site selection and preparation for protected cultivation. - Explain how to identify details of the plants to be grown such as growing period, growing media and growing system, environmental conditions required, etc. - List the considerations for selection of protected cultivation design, features, materials and dimensions. - Describe the facilities that have to be made available before installation with respect to water and electricity. - State authorized sources for information, materials and technology related to protected cultivation. - Describe the general procedure and precautions for procurement of the protected cultivation structure and related technology. - Describe the steps involved for installation and commissioning of protected cultivation structure.	- Specify design, features, materials and dimensions suited to particular site, crop to be grown, local climatic conditions, budgets, etc. - Demonstrate the pre-installation checks. - Prepare a checklist for selecting a vendor for protected cultivation structure and accessories. - Prepare the area for installation of protected cultivation structure. - Prepare a sample plan for installation and commissioning of the protected cultivation structure.
Classroom Aids:	
Computer, Projection Equipment, PowerPoint Presentation and software, Facilitator's Guide, Participant's Handbook	
Tools, Equipment and Other Requirements	

Wooden stakes, rake, shovel, PVC pipe, professional-grade landscape fabric, gravel, compost, sample protected cultivation structures and accessories; Environment control technology for protected cultivation for cooling, heating, humidification, fertigation, lighting, enriching gaseous composition, irrigation, fogging, pesticide spraying, etc.

Module 4: Installation of structure
Mapped to NOS AGR/N1009 v1.0

Terminal Outcomes:

- Supervise installation of various components of the protected cultivation structure.

Duration: *10:00*	**Duration**: *30:00*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
- Describe the process for installation of the protected cultivation structure. - Describe the activities involved for smooth co-ordination and supervision during the installation of the structure. - Explain the importance of a stable structure for protected cultivation. - State the auxiliary facilities that are to be installed along with the protected cultivation structure such as electric points and wiring, water supply and storage, communication systems, etc.	- Prepare the checklist for monitoring the installation of the protected structure. - Demonstrate use of different cladding material, polyhouse film, foundation pipe, labelling, polyhouse length and width, orientation, exhaust fan and cooling pads, shading net, sensors and controllers, etc.
Classroom Aids:	
Computer, Projection Equipment, PowerPoint Presentation and software, Facilitator's Guide, Participant's Handbook	
Tools, Equipment and Other Requirements	
Components of walk-in tunnels, natural ventilation greenhouses, poly cum shade house, poly tunnel, shade house etc.; Thermometers, humidity meters, pH meters, Electrical Conductivity (EC) meter, lux meter, CO2 enrichment or maintenance device	

Module 5: Commission protected cultivation structure/s
Mapped to NOS AGR/N1009 v1.0

Terminal Outcomes:

- Commission the protected cultivation structure

Duration: *05:00*	Duration: *10:00*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
- Describe the commissioning process for the protected cultivation structure. - Describe the process to be followed in case there is a fault or damage in the installation.	- Demonstrate checking the quality of the structures installed. - Demonstrate testing the environmental controls for desired operability. - Demonstrate checking the adequacy of various types of accessories used in installing protected cultivation structures. - Demonstrate checking the ventilation facility for adequate air circulation suited to crop requirements. - Demonstrate checking the functioning of the irrigation system
Classroom Aids:	
Computer, Projection Equipment, PowerPoint Presentation and software, Facilitator's Guide, Participant's Handbook	
Tools, Equipment and Other Requirements	
Walk-in tunnels, natural ventilation greenhouses, poly cum shade house, poly tunnel, shade house etc.; Thermometers, humidity meters, pH meters, Electrical Conductivity (EC) meter, lux meter, CO_2 enrichment or maintenance device	

Module 6: Preparation for maintenance
Mapped to NOS AGR/N1010 v1.0

Terminal Outcomes:

- Inspect the structure for identifying maintenance requirements
- Plan for maintenance
- Organise tools, materials and other resources

Duration: 04:00	Duration: 08:00
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Describe the maintenance requirements for protected cultivation structures and environmental control technologies. • Explain the considerations for regular adjustment of environmental conditions to achieve optimum crop growth. • Describe the inspection and maintenance process. • Describe the planning and scheduling process for maintenance activities. • List tools, equipment and materials required for maintenance of protected cultivation structures.	• Inspect the protected cultivation structure's effectiveness and stability • Demonstrate the various checks performed on the protected cultivation structure, accessories and environmental controls. • Demonstrate how to adapt the installed controls and facilities with respect to changing weather conditions • Prepare a list of maintenance requirements for the inspected protected cultivation structure, facilities and controls • Demonstrate the planning and scheduling of maintenance tasks.
Classroom Aids:	
Computer, Projection Equipment, PowerPoint Presentation and software, Facilitator's Guide, Participant's Handbook	
Tools, Equipment and Other Requirements	
Walk-in tunnels, natural ventilation greenhouses, poly cum shade house, poly tunnel, shade house etc.; Thermometers, humidity meters, pH meters, Electrical Conductivity (EC) meter, lux meter, CO_2 enrichment or maintenance device	

Module 7: Oversee maintenance of the structure
Mapped to NOS AGR/N1010 v1.0

Terminal Outcomes:

- Monitor the maintenance activities
- Ensure proper upkeep of the structure

Duration: *12:00*	Duration: *24:00*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Explain the importance of monitoring the maintenance activities. • Explain the importance of ensuring timely repair and replacement of damaged parts and equipment. • Explain the importance of immediate escalation of material wastage problems that cannot be rectified to appropriate authority.	• Demonstrate methods to evaluate the quality of the maintenance work performed. • Show how to use the tools, equipment and materials safely without waste and damage. • Show how to clean and secure the protected cultivation structure.
Classroom Aids:	
Computer, Projection Equipment, PowerPoint Presentation and software, Facilitator's Guide, Participant's Handbook	
Tools, Equipment and Other Requirements	
Walk-in tunnels, natural ventilation greenhouses, poly cum shade house, poly tunnel, shade house etc.; Thermometers, humidity meters, pH meters, Electrical Conductivity (EC) meter, lux meter, CO_2 enrichment or maintenance device, Basic workshop tool kit	

Module 8: Optimum resource utilization
Mapped to NOS AGR/N1010 v1.0

Terminal Outcomes:

- Optimize usage of materials and water
- Optimize usage of energy/electricity
- Manage waste effectively
- Curb pollution
- Conserve soil

Duration: *04:00*	Duration: *08:00*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
- List the different types of resources available at the workplace. - Explain practices for resources conservation including water and electricity in various tasks/activities/processes. - Explain the benefits of resource optimization. - List practices that result in inefficient utilization of resources. - Explain the environment friendly work practices. - Distinguish among recyclable, non-recyclable and hazardous waste at the workplace. - Describe the waste management process and methods of waste disposal. - List common sources of pollution and ways to minimize it. - Explain the importance of soil conservation and various soil conservation practices.	- Demonstrate different methods of resource conservation at the workplace. - Demonstrate the process of proper cleaning of tools, machines and equipment. - Demonstrate practices for electricity/energy conservation in various tasks/activities/processes. - Demonstrate segregation of waste into different categories. - Demonstrate how to dispose the waste as per the procedure. - Demonstrate how to deposit recyclable and reusable material at identified location. - Demonstrate soil conservation practices.
Classroom Aids:	
Computer, Projection Equipment, PowerPoint Presentation and software, Facilitator's Guide, Participant's Handbook	
Tools, Equipment and Other Requirements	
Energy saving devices, Non-recyclable, recyclable and reusable waste	

Module 9: Basic entrepreneurial activities
Mapped to NOS AGR/N9908 v2.0

Terminal Outcomes:

- Handle accounts and marketing activities
- Gather information relevant to sales and marketing

Duration: 20:00	Duration: 10:00
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
- Describe how to do basic accounting practices such as calculating expenses incurred, total cost of production etc. - Explain how to determine market value of the produce. - Explain how to determine the demand and supply of produce in the market. - Describe how to identify target customers and assess their needs such as amount required, purpose, quality, expectations, etc. - Explain relevant regulations related to marketing and sale of the produce. - List various trading channels of produce and their margin of profit. - Discuss various subsidies/ funds offered by the Government, authorized state units and other financial institutions involved with the promotion and sale of produce. - Describe strategies for choosing and exploiting marketing channels related to the produce such as retailers, vendors, whole-sellers (mandi), e-trading platforms, related companies, marketing associations, cold storage owners, exporters, etc.	- Prepare a sample market survey report related to the supply and demand of the price, prevailing prices in different markets, etc. - Calculate the cost of production, transportation and marketing of the sample produce. - Prepare the pricing scheme for the produce for different type of buyers. - Collect information related to various subsidies/funds offered by the government, authorized state units and other financial institutions involved with the promotion of the produce. - Demonstrate the method of recording sale and purchase of items in the given format. - Demonstrate the method of recording quantity, quality, date of manufacture and batch number of the sample produce.
Classroom Aids:	
Computer, Projection Equipment, PowerPoint Presentation and software, Facilitator's Guide, Participant's Handbook	
Tools, Equipment and Other Requirements	
Nil	

Module 11: 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: *04:00*	Duration: *04:00*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
- 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.	- 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 the workplace sanitization norms. - Show how to ensure 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	

Module 12: 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: 07:00	Duration: 10:00
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
- List the PPE required at the workplace. - Describe the common 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.	- Check various areas of the workplace for leakages, water logging, pests, fire, etc. - Demonstrate how to safely use the PPE and implements 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 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 13: 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: *15:00*	Duration: *25:00*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
- 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	- 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 14: Nurturing Seedlings under Protected Cultivation
Mapped to NOS AGR/N1011 v1.0

Terminal Outcomes:

- Nurture the plants in the nursery

Duration: *08:00*	Duration: *25:00*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
- 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.	- 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 15: 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**: *16:00*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
- 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.	- 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 16: Preparation for vegetable cultivation under protected cultivation
Mapped to NOS AGR/N1012 v1.0

Terminal Outcomes:

- Select the protected cultivation structure as per the vegetable crop
- Prepare growth media for plantation

Duration: 08:00	Duration: 16:00
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
- State the advantages of growing vegetable crops under protected condition - Describe the favourable conditions required for vegetable cultivation under protected structures - List the major vegetable crops and their varieties that are commercially grown under protected condition - Describe the types of protected structures used for growing various vegetable 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 vegetable 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.	- Demonstrate the process of assessment and adjustment of the environmental conditions within the protected structure, based on the requirement of the vegetable crop. - Select appropriate growth media for vegetable 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 seed bed preparation procedures
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, coco peat, vermiculite, perlite, rock wool, sand, rice husk, bark, sphagnum peat moss and saw dust; digger; spade; hoe; mulching materials; watering can

Module 17: Planting a Vegetable Crop
Mapped to NOS AGR/N1012 v1.0

Terminal Outcomes:

- Plant a vegetable crop under protected cultivation

Duration: 08:00	Duration: 16:00
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
- Describe the types of planting materials used for vegetable crop cultivation and their treatment. - Describe the soil and soilless planting practices used for common and commercially viable vegetable crops	- Select planting material for vegetable crop such as seed, seedlings raised in nurseries, tissue cultured plantlets, etc. - Demonstrate the cleaning and preparation of the planting material - Demonstrate methods for supporting the propagation method, such as timely weeding, centering and straightening, etc. - 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; vegetable planting material for tomato, yellow and red bell peppers, cucumber, leafy and exotic vegetables; seedling tray; seed boxes; trowel; rake; hoe; stakes; hand cutter; long cutter; digging fork; trowel; secateurs; watering can; mulching materials	

Module 18: Nurturing a Vegetable Crop
Mapped to NOS AGR/N1012 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**
- Describe the growth regulation practices used for common vegetable crops, their purpose, tools and correct procedures - Describe nutrition management of vegetable crops under protected cultivation. - Describe irrigation management of vegetable crops under protected condition. - Describe drainage systems and techniques used for growing vegetable crops under different types of protected structures. - Describe pests, weeds and diseases in vegetable crops and their symptoms, prevention and control procedures - Describe the practices of crop rotation with legumes, inter-cropping and barrier cropping	- Demonstrate the low tunnel technique to cover the planted vegetable crops - Prepare a sample daily/weekly irrigation and fertigation schedule as per the requirement of the crop. - Demonstrate irrigation of the crop using appropriate irrigation system such as micro-irrigation system/foggers or mist system. - Demonstrate application of appropriate dose of manure and 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 vegetables and bending of shoots as required. - Identify symptoms of disease, infestation, disorder and damage in the sample vegetable crop. - Demonstrate application of appropriate measures for prevention and treatment of disease, infestation, disorder and damage to the sample vegetable crop.
Classroom Aids:	
Computer, Projection Equipment, PowerPoint Presentation and software, Facilitator's Guide, Participant's Handbook	

Tools, Equipment and Other Requirements

Sprayer, fertilizers, bio-fertilizers, weeding machine, sickle, pest control devices, micro-irrigation system, foggers and mist system

Module 19: Harvesting a Vegetable Crop
Mapped to NOS AGR/N1012 v1.0

Terminal Outcomes:

- Harvest the vegetable crop under protected cultivation

Duration: *08:00*	Duration: *16:00*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
- Describe the harvesting practices used for vegetable crops that ensure maximum yield. - Identify market requirement for commercial vegetables 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 vegetables as per the market requirement. - Describe sorting and grading methods and considerations for vegetable crop. - Explain the need to arrange buyers for the segregated produce which do not meet 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 vegetables. - Describe safe storage, loading, unloading and stacking techniques of the marketable produce. - Describe various opportunities for marketing and selling the produce.	- Demonstrate harvesting methods based on crop type and type of protected cultivation. - Demonstrate temporary storage of the vegetable produce post-harvest. - Use weighing machines to weigh the harvested produce accurately. - Demonstrate sorting and grading of the harvested produce based on quality, colour 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 conrainers	

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**
- 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.	- 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**
• 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	• 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, lilium, 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**
- 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.	- 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 9: Employability Skills (90 hours)
Mapped to NOS DGT/VSQ/N0103 v1.0

Duration: 90:00
Key Learning Outcomes

Introduction to Employability Skills Duration: 3 Hours
After completing this programme, participants will be able to:
1. Outline the importance of Employability Skills for the current job market and future of work
2. List different learning and employability related GOI and private portals and their usage
3. Research and prepare a note on different industries, trends, required skills and the available opportunities

Constitutional values - Citizenship Duration: 1.5 Hours
4. 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
5. Demonstrate how to practice different environmentally sustainable practices

Becoming a Professional in the 21st Century Duration: 5 Hours
6. Discuss relevant 21st century skills required for employment
7. Highlight the importance of practicing 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
8. Create a pathway for adopting a continuous learning mindset for personal and professional development

Basic English Skills Duration: 10 Hours
9. Show how to use basic English sentences for everyday conversation in different contexts, in person and over the telephone
10. Read and understand text written in basic English
11. Write a short note/paragraph / letter/e -mail using correct basic English

Career Development & Goal Setting Duration: 4 Hours
12. Create a career development plan
13. Identify well-defined short- and long-term goals

Communication Skills Duration: 10 Hours
14. Demonstrate how to communicate effectively using verbal and nonverbal communication etiquette
15. Write a brief note/paragraph on a familiar topic
16. Explain the importance of communication etiquette including active listening for effective communication
17. Role play a situation on how to work collaboratively with others in a team

Diversity and Inclusion Duration: 2.5 Hours
18. Demonstrate how to behave, communicate, and conduct appropriately with all genders and PwD
19. Discuss the significance of escalating sexual harassment issues as per POSH act

Financial and Legal Literacy Duration: 10 Hours

20. Discuss various financial institutions, products, and services
21. Demonstrate how to conduct offline and online financial transactions, safely and securely and check passbook/statement
22. Explain the common components of salary such as Basic, PF, Allowances (HRA, TA, DA, etc.), tax deductions
23. Calculate income and expenditure for budgeting
24. Discuss the legal rights, laws, and aids

Essential Digital Skills Duration: 20 Hours

25. Describe the role of digital technology in day-to-day life and the workplace
26. Demonstrate how to operate digital devices and use the associated applications and features, safely and securely
27. Demonstrate how to connect devices securely to internet using different means
28. Follow the dos and don'ts of cyber security to protect against cyber crimes
29. Discuss the significance of displaying responsible online behavior while using various social media platforms
30. Create an e-mail id and follow e- mail etiquette to exchange e -mails
31. Show how to create documents, spreadsheets and presentations using appropriate applications
32. utilize virtual collaboration tools to work effectively

Entrepreneurship Duration: 7 Hours

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

Customer Service Duration: 9 Hours

37. Classify different types of customers
38. Demonstrate how to identify customer needs and respond to them in a professional manner
39. Discuss various tools used to collect customer feedback
40. Discuss the significance of maintaining hygiene and dressing appropriately

Getting ready for apprenticeship & Jobs Duration: 8 Hours

41. Draft a professional Curriculum Vitae (CV)
42. Use various offline and online job search sources to find and apply for jobs
43. Discuss the significance of maintaining hygiene and dressing appropriately for an interview
44. Role play a mock interview
45. List the steps for searching and registering for apprenticeship opportunities

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
- 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.	- 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	

Annexure

Trainer Prerequisites						
Minimum Educational Qualification	Specialization	Relevant Industry Experience		Training Experience		Remarks
		Years	*Specialization*	*Years*	*Specialization*	
Diploma	Agriculture/Horticulture	3	Experience required in Horticulture under protected condition	0		Ex-Service-Man including Ex-Paramilitary personnel: Minimum Qualification is 10+2 with an Honorable Discharge/Pension. SSC would consider a relaxation/waiver of sector specific experience on case to case basis.
Graduate		2	Experience required in Horticulture under protected condition	0		
Graduate	Agriculture / Horticulture /Botany/ Forestry	1	Experience required in Horticulture under protected condition	0		
Post Graduate	Agriculture / Horticulture	0.5	Experience required in Horticulture under protected condition			

Trainer Certification	
Domain Certification	**Platform Certification**
Certified for Job Role: "Horticulturist – Protected Cultivation" mapped to QP: "AGR/Q1004, v2.0". Minimum accepted score is 80%	Recommended that the Trainer is certified for theJob Role: "Trainer (Vet and Skills)", mapped to the Qualification Pack: "MEP/Q2601, v2.0". 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	(Agriculture/ Botany/ Horticulture/Forestry)	2	Experience required in the relevant sector—Protected Horticulture-/Nursery/Olericulture/ Floriculture/ Greenhouse Management			
Post-graduation	(Agriculture/Botany/ Horticulture/Forestry)	1	Experience required in the relevant sector—Protected Horticulture-/Nursery/Olericulture/ Floriculture/ Greenhouse Management			
PhD	(Agriculture/Horticulture/ Botany/Forestry)	1	Experience required in the relevant sector—Protected Horticulture-/Nursery/Olericulture/ Floriculture/ Greenhouse Management			

Assessor Certification	
Domain Certification	**Platform Certification**
Certified for Job Role: "Horticulturist – Protected Cultivation" mapped to QP: "AGR/Q1004, v2.0". Minimum accepted score is 80%	Certified for the Job Role: "Assessor (Vet and Skills)", mappedto the Qualification Pack: "MEP/Q2701, v2.0".Minimum accepted score is 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. <u>Multiple Choice Questions</u>: To assess basic knowledge (Objective/Subjective)
2. <u>Viva</u>: To assess awareness on processes (Oral and/or written questioning)
3. <u>Practical:</u> 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 ground through qualified and ToA certified assessors.

While it is important that an individual has adequate knowledge and skills to perform a specific task, weight age for different aspects for assessment are 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 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 assessment location.

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

- Multilingual assessments (ASCI is conducting 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 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 training / within 7 days of

completion of training.

- Assessment will be conducted at the training venue
- 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 practical 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 question, etc. which will test the trainee on his theoretical knowledge of the subject.
- The theory, practical and viva assessments will be carried out on same day. In case of more number of candidates, 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 usability of job roles/advantages /importance of adherence to procedures. Viva will be used to gauge trainee's confidence and correct knowledge in handling 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, behavioral traits and domain knowledge.

Theoretical Knowledge - Item constructs and types are determined by 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 which 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 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 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, do's and don'ts, subjective questions to check understanding of practical tasks.

Assessor has to go through orientation program organized by Assessment Agency. The training would give an overview to the assessors on the overall framework of QP evaluation. Assessor shall be given a NOS and PC level overview of each QP as applicable. 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 which will maintain standardization of marking scheme.

Type of Evidence and Evidence Gathering Protocol:

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

- Geo Tagging to track ongoing assessment
- AA's coordinator emails the list of documents and evidences (photos and videos) to the assessor one day prior to the assessment. List is mentioned below:
    - Signed Attendance sheet
    - Assessor feedback sheet
    - Candidate feedback sheet
    - Assessment checklist for assessor
    - Candidate Aadhar/ID card verification
    - Pictures of 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, Technical assistant popularly known as Proctor also ensures the proper documentation and they verify each other's tasks.
- To validate their work on the day of assessment, regular calls and video calls are done.
- On-boarding and training of assessor and proctor is done on timely basis to ensure that quality of the assessment should be maintained.
- Training covers the understanding of QP, NSQF level, NOS and assessment structure

Methods of Validation

- <u>Morning Check (Pre-Assessment)</u>: 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.
- <u>Video Calls</u>: Random video calls are made to the technical SPOC/assessor so as to keep check on assessment quality and ensure assessment is carried out in fair and transparent manner
- <u>Aadhar verification</u> of candidates
- <u>Evening Check (Post Assessment)</u>: Calls are made to the ground team to ensure event is over by what time and the documentation is done in proper manner or not.
- <u>TP Calling</u>: To keep check on malpractice activity, independent audit team calls to TP on recorded line to take confirmation if there was any malpractice activity observed in assessment on part of AA/SSC team. If calls are not connected, email is send to TP SPOC for taking their confirmation
- <u>Video and Picture Evidence:</u> Backend team collects video and pictures for assessment on real time basis and highlights any issue like, Students sitting idle/trainer allowed for helping out candidates during assessment.
- <u>Surprise Visit</u>: Time to time SSC/AA Audit team can visit the assessment location and do surprise audit for assessment process carried out by ground team.
- <u>Geo Tagging:</u> On day of assessment, each technical SPOC is required to login in our internal app which is Geo tagged. Any deviation with centre address needs to be highlighted to assessment team on real-time basis.

Method for assessment documentation, archiving, and Access:
- ASCI has fully automated result generation process in association with multiple AAs
- Theory, Practical and Viva marks forms the basis of the results and encrypted files generated to avoid data manipulation. All responses captured and stored in System with Time-Stamps at the end of AAs and SSC. NOS-wise and PC-wise scores can be generated.
- Maker Checker concept: 1 person prepares results and other audit result which is internally approved by AA at first and then gets vetted at the end of SSC
- All soft copy of documents is received from the on-ground tech team over mail. The same are downloaded by our internal backend team and saved in Repository. The repository consists of scheme wise folders. These scheme wise folders have 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 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 conclusion of project or scheme)

References

Glossary

Sector	Sector is a conglomeration of different business operations having similar business and interests. It may also be defined as a distinct subset of the economy whose components share similar characteristics and interests.
Sub-sector	Sub-sector is derived from a further breakdown based on the characteristics and interests of its components.
Occupation	Occupation is a set of job roles, which perform similar/ related set of functions in an industry.
Job role	Job role defines a unique set of functions that together form a unique employment opportunity in an organisation.
Occupational Standards (OS)	OS specify the standards of performance an individual must achieve when carrying out a function in the workplace, together with the Knowledge and Understanding (KU) they need to meet that standard consistently. Occupational Standards are applicable both in the Indian and global contexts.
Performance Criteria (PC)	Performance Criteria (PC) are statements that together specify the standard of performance required when carrying out a task.
National Occupational Standards (NOS)	NOS are occupational standards which apply uniquely in the Indian context.
Qualifications Pack (QP)	QP comprises the set of OS, together with the educational, training and other criteria required to perform a job role. A QP is assigned a unique qualifications pack code.
Unit Code	Unit code is a unique identifier for an Occupational Standard, which is denoted by an 'N'
Unit Title	Unit title gives a clear overall statement about what the incumbent should be able to do.
Description	Description gives a short summary of the unit content. This would be helpful to anyone searching on a database to verify that this is the appropriate OS they are looking for.
Scope	Scope is a set of statements specifying the range of variables that an individual may have to deal with in carrying out the function which have a critical impact on quality of performance required.

Knowledge and Understanding (KU)	Knowledge and Understanding (KU) are statements that together specify the technical, generic, professional and organisational specific knowledge that an individual need in order to perform to the required standard.
Organisational Context	Organisational context includes the way the organisation is structured and how it operates, including the extent of operative knowledge managers have of their relevant areas of responsibility.
Technical Knowledge	Technical knowledge is the specific knowledge needed to accomplish specific designated responsibilities.
Core Skills/ Generic Skills (GS)	Core skills or Generic Skills (GS) are a group of skills that are the key to learning and working in today's world. These skills are typically needed in any work environment in today's world. These skills are typically needed in any work environment. In the context of the OS, these include communication- related skills that are applicable to most job roles.
Electives	Electives are NOS/set of NOS that are identified by the sector as contributive to specialization in a job role. There may be multiple electives within a QP for each specialized job role. Trainees must select at least one elective for the successful completion of a QP with Electives.
Options	Options are NOS/set of NOS that are identified by the sector as additional skills. There may be multiple options within a QP. It is not mandatory to select any of the options to complete a QP with Options.

Acronyms and Abbreviations

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