



Model Curriculum

QP Name: Hydroponics Technician

QP Code: AGR/Q0808

Version: 3.0

NSQF Level: 4

Model Curriculum Version: 2.0

Agriculture Skill Council of India | | Agriculture Skill Council of India (ASCI), 6th Floor, GNG Tower, Plot
No. 10, Sector - 44

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Training Parameters

Sector	Agriculture
Sub-Sector	Agriculture Crop Production
Occupation	Landscaping, Gardening & Urban Farming
Country	India
NSQF Level	4
Aligned to NCO/ISCO/ISIC Code	NCO-2015/NIL
Minimum Educational Qualification and Experience	<p>Minimum Educational Qualification: 12th grade pass OR Completed 2nd year of 3-year diploma (after 10th) and pursuing regular diploma OR 10th grade pass plus 2-year NTC OR 10th grade pass plus 1-year NTC plus 1 year NAC OR 8th pass plus 2-year NTC plus 1-Year NAC plus CITS OR 10th grade pass and pursuing continuous schooling OR 10th Grade Pass with 2-year relevant experience OR Previous relevant Qualification of NSQF Level 3.0 with minimum education as 8th Grade pass with 3- year relevant experience OR Previous relevant Qualification of NSQF Level 3.5 with 1.5- year relevant experience</p>
Pre-Requisite License or Training	NA
Minimum Job Entry Age	18 Years
Last Reviewed On	31-03-2022
Next Review Date	31-03-2025
NSQC Approval Date	31-03-2022
QP Version	3.0
Model Curriculum Creation Date	31-03-2022

Model Curriculum Valid Up to Date	31-03-2025
Model Curriculum Version	2.0
Minimum Duration of the Course	390 Hours
Maximum Duration of the Course	390 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:

- 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.
- Explain the basic entrepreneurial activities for small enterprise.
- Describe the process of undertaking employability and entrepreneurial practices.
- Demonstrate various practices to maintain personal hygiene, cleanliness, and safety at the workplace.

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	0:00	0:00	05:00
Module 1: Introduction to the role of a Hydroponics Technician	05:00	0:00	0:00	0:00	05:00
AGR/N0822 Set up and maintain the hydroponic system and plants/ crop NOS Version- 2.0 NSQF Level- 4	20:00	35:00	0:00	0:00	55:00
Module 2: Process of setting up and maintain the hydroponic system and plants/ crop	20:00	35:00	0:00	0:00	55:00
AGR/N0846 Set up and maintain the aeroponic farm NOS Version- 1.0 NSQF Level- 4	20:00	40:00	0:00	0:00	60:00
Module 3: Process of setting up and maintaining the aeroponic farm	20:00	40:00	0:00	0:00	60:00

AGR/N0823 Carry out harvesting, post-harvest management and marketing activities NOS Version- 2.0 NSQF Level- 4	30:00	30:00	0:00	0:00	60:00
Module 4: Process of carrying out harvesting, post-harvest management and marketing activities	30:00	30:00	0:00	0:00	60:00
AGR/N9903 Maintain health and safety at the workplace NOS Version- 3.0 NSQF Level-4	15:00	15:00	0:00	0:00	30:00
Module 5: Hygiene and cleanliness	03:00	03:00	0:00	0:00	06:00
Module 7: Safety and emergency procedures	12:00	12:00	0:00	0:00	24:00
DGT/VSQ/N0102 Employability Skills NOS Version-1.0 NSQF Level-4	60:00	00:00	0:00	0:00	60:00
Module 8: Employability Skills	60:00	00:00	0:00	0:00	60:00
Total Duration	150:00	120:00	120:00	0:00	390:00

Module Details

Module 1: Introduction to the role of a Hydroponics Technician

Bridge Module

Terminal Outcomes:

- Discuss the job role of a Hydroponics Technician.

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. • Discuss the role and responsibilities of a Hydroponics Technician. • Identify various employment opportunities for a Hydroponics Technician. 	
Classroom Aids	
Training Kit - Trainer Guide, Presentations, Whiteboard, Marker, Projector, Laptop, Video Films	
Tools, Equipment and Other Requirements	
NA	

Module 2: 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: 20:00	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 hydroponic farming. 	<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.

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| <ul style="list-style-type: none"> • 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 nutrient solution according to plant | <ul style="list-style-type: none"> • 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 |
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<p>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 3: 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.
- Demonstrate various waste management practices
- Discuss ways to promote diversity and inclusion at the workplace.

Duration: 20:00	Duration: 40:00
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 and disease in plants. 	<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

<ul style="list-style-type: none"> • Explain the benefits of resource optimisation. • Explain the importance of recycling and disposing different types of waste as per the applicable regulations. • Explain the importance of inclusion of all genders and People with Disability (PwD) at the workplace. 	<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. • Demonstrate the process of recycling and disposing different types of waste appropriately. • Demonstrate appropriate verbal and non-verbal communication that is respectful of genders and disability.
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 4: 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: 30:00	Duration: 30:00
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. • Explain the relevant parameters to sort and grade the harvested produce 	<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.

<p>on.</p> <ul style="list-style-type: none"> • 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 5: 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: 03:00	Duration: 03:00
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 the 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 6: 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: 12:00	Duration: 12:00
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 implements 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 7: Employability Skills (60 hours)

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 analysing 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 Industry Experience		Training Experience		Remarks
		Years	Specialization	Years	Specialization	
Certificate-NSQF	Hydroponics Technician	5	Hydroponics	0		Hydroponics Technician with 5 Years of experience with corporates/ NGO/ Hydroponics Entrepreneur and 10th Pass
12 th Class	Biology Stream/ Elective Agriculture	5	Hydroponics			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.
Diploma	Agriculture/ Horticulture	3	Hydroponics	0		
Graduate	Agriculture /Horticulture / Botany/ Biotechnology/ Agriculture Engineering	1	Hydroponics	0		For the school Program minimum qualification of the Trainer should be Graduate (Agriculture /Horticulture / Botany/ Biotechnology/ Agriculture Engineering) with minimum 3 years Teaching experience (will be considered industry experience)
Post-Graduate	Agriculture/ Horticulture/ Botany/ Biotechnology	1	Hydroponics	0		

Trainer Certification	
Domain Certification	Platform Certification
Certified for Job Role “ Hydroponics Technician ”, mapped to QP: “AGR/Q0808, v3.0”, 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	
B.Sc.	Agriculture/ Botany/ Forestry/ Agronomy/ Horticulture and related streams	5	Agriculture/ Forestry/ Horticulture and related streams	0		Practical skills and knowledge required in Hydroponics
M.Sc.	Agriculture/ Botany/ Forestry/ Agronomy/ Horticulture and related streams	2	Agriculture/ Forestry/ Horticulture and related streams	0		Practical skills and knowledge required in Hydroponics
PhD	Agriculture/ Botany/ Forestry/ Agronomy/ Horticulture and related streams	1	Agriculture/ Forestry/ Horticulture and related streams	0		Practical skills and knowledge required in Hydroponics

Assessor Certification	
Domain Certification	Platform Certification
Certified for Job Role “ Hydroponics Technician ”, mapped to QP: “AGR/Q0808, v3.0”, 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 are 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 is 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 tools 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 the assessor and proctor are 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-Stamped 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 candidates 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	The 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	The 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
DFT	Deep Flow Technique
DWC	Deep-Water Culture
EC	Electrical conductivity
NFT	Nutrient Film Technique
NOS	National Occupational Standard (s)
NSQF	National Skills Qualifications Framework
OJT	On-the-job Training
QP	Qualifications Pack
PVC	Polyvinyl Chloride
PwD	People with Disability
PPE	Personal Protective Equipment