



QUALIFICATION FILE

Hydroponics Technician

☒ Short Term Training (STT) ☐ Long Term Training (LTT) ☒ Apprenticeship

☒ Upskilling ☐ Dual/Flexi Qualification ☒ For ToT ☒ For ToA

☐ General ☐ Multi-skill (MS) ☐ Cross Sectoral (CS) ☒ Future Skills ☐ OEM

NCrF/NSQF Level: 4

Submitted By:

Agriculture Skill Council of India

Unit No. 101, First Floor, Greenwoods Plaza, Block 'B', Greenwoods City, Sector 45, Gurugram -122009, Haryana.

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Section 1: Basic Details

1.	Qualification Name	Hydroponics Technician																
2.	Sector/s	Agriculture																
3.	Type of Qualification: ☐ New ☒ Revised ☐ Has Electives/Options ☐ OEM	NQR Code & version of existing qualification: QG-04-AG-00289-2023-V1.1-ASCI	Qualification Name of existing/previous version: Hydroponics Technician															
4.	a. OEM Name b. Qualification Name (Wherever applicable)	NA																
5.	National Qualification Register (NQR) Code &Version (Will be issued after NSQC approval)	QG-04-AG-00289-2025-V2-ASCI	6. NCrF/NSQF Level: 4															
7.	Award (Certificate/Diploma/Advance Diploma/ Any Other (Wherever applicable specify multiple entry/exits also & provide details in annexure)	Certificate																
8.	Brief Description of the Qualification	A Hydroponics Technician grows plants in a controlled environment using alternative materials instead of soil as per the hydroponics farming method. The individual is also responsible for setting and maintaining a hydroponic farm apart from maintaining, harvesting and marketing the plants grown at the farm.																
9.	Eligibility Criteria for Entry for Student/Trainee/Learner/Employee	a. Entry Qualification & Relevant Experience: <table border="1"> <thead> <tr> <th>S. No.</th><th>Academic/Skill Qualification (with Specialization - if applicable)</th><th>Required Experience (with Specialization - if applicable)</th></tr> </thead> <tbody> <tr> <td>1</td><td>12th (Science) or equivalent</td><td></td></tr> <tr> <td>2</td><td>10th Class Pass</td><td>3 Years of relevant experience in Agriculture and allied sectors</td></tr> <tr> <td>3</td><td>Previous NSQF Level 3.5</td><td>1.5 Years of relevant experience in Agriculture and allied sectors</td></tr> <tr> <td>4</td><td>Previous NSQF Level 3.0</td><td>3 Years of relevant experience in Agriculture and allied sectors</td></tr> </tbody> </table> b. Age: NA		S. No.	Academic/Skill Qualification (with Specialization - if applicable)	Required Experience (with Specialization - if applicable)	1	12 th (Science) or equivalent		2	10th Class Pass	3 Years of relevant experience in Agriculture and allied sectors	3	Previous NSQF Level 3.5	1.5 Years of relevant experience in Agriculture and allied sectors	4	Previous NSQF Level 3.0	3 Years of relevant experience in Agriculture and allied sectors
S. No.	Academic/Skill Qualification (with Specialization - if applicable)	Required Experience (with Specialization - if applicable)																
1	12 th (Science) or equivalent																	
2	10th Class Pass	3 Years of relevant experience in Agriculture and allied sectors																
3	Previous NSQF Level 3.5	1.5 Years of relevant experience in Agriculture and allied sectors																
4	Previous NSQF Level 3.0	3 Years of relevant experience in Agriculture and allied sectors																
10.	Credits Assigned to this Qualification, Subject to Assessment (as per National Credit Framework (NCrF))	13	11. Common Cost Norm Category (I/II/III) (wherever applicable): II															

12.	Any Licensing requirements for Undertaking Training on This Qualification <i>(wherever applicable)</i>	NA																						
13.	Training Duration by Modes of Training Delivery <i>(Specify Total Duration as per selected training delivery modes and as per requirement of the qualification)</i>	☒ Offline ☐ Online ☐ Blended <table border="1"> <thead> <tr> <th>Training Delivery Modes</th> <th>Theory (Hours)</th> <th>Practical (Hours)</th> <th>OJT Mandatory (Hours)</th> <th>OJT Recommended (Hours)</th> <th>Total (Hours)</th> </tr> </thead> <tbody> <tr> <td>Classroom (offline)</td> <td>150</td> <td>120</td> <td>120</td> <td></td> <td>390</td> </tr> <tr> <td>Online</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table> <i>(Refer Blended Learning Annexure for details)</i>					Training Delivery Modes	Theory (Hours)	Practical (Hours)	OJT Mandatory (Hours)	OJT Recommended (Hours)	Total (Hours)	Classroom (offline)	150	120	120		390	Online					
Training Delivery Modes	Theory (Hours)	Practical (Hours)	OJT Mandatory (Hours)	OJT Recommended (Hours)	Total (Hours)																			
Classroom (offline)	150	120	120		390																			
Online																								
14.	Aligned to NCO/ISCO Code/s <i>(if no code is available mention the same)</i>	NCO-2015/3142.9900																						
15.	Progression path after attaining the qualification <i>(Please show Professional and Academic progression)</i>	Hydroponics Technician(L4), Horticulture Supervisor (Garden/Nursery/ Turf) (L5)																						
16.	Other Indian languages in which the Qualification & Model Curriculum are being submitted	Hindi																						
17.	Is similar Qualification(s) available on NQR-if yes, justification for this qualification	☐ Yes ☒ No URLs of similar Qualifications:																						
18.	Is the Job Role Amenable to Persons with Disability	☒ Yes ☐ No If “Yes”, specify applicable type of Disability: SHI																						
19.	How Participation of Women will be Encouraged	Batches specific to women will be formed																						
20.	Are Greening/ Environment Sustainability Aspects Covered <i>(Specify the NOS/Module which covers it)</i>	☒ Yes ☐ No DGT/VSQ/N0102 (v1.0)																						
21.	Is Qualification Suitable to be Offered in Schools/Colleges	Schools ☒ Yes ☐ No Colleges ☒ Yes ☐ No																						
22.	Name and Contact Details of Submitting / Awarding Body SPOC <i>(In case of CS or MS, provide details of both Lead AB & Supporting ABs)</i>	Name: Ms Purnambica Email: standards@asci-india.com Website: www.asci-india.com Contact No.: 0124-4670029																						
23.	Final Approval Date by NSQC: 08-05-2025	24. Validity Duration: 3 years post NSQC Approval			25. Next Review Date: 08-05-2028																			

Section 2: Module Summary

NOS/s of Qualifications

(In exceptional cases these could be described as components)

Mandatory NOS/s:

Specify the training duration and assessment criteria at NOS/ Module level. For further details refer curriculum document.

Th.-Theory **Pr.**-Practical **OJT**-On the Job **Man.**-Mandatory Training **Rec.**-Recommended **Proj.**-Project

S. No	NOS/Module Name	NOS/Module Code & Version (if applicable)	Core / Non-Core	NCrF/NS QF Level	Credits as per NCrF	Training Duration (Hours)					Assessment Marks					
						Th.	Pr.	OJT-Man.	OJT-Rec.	Total	Th.	Pr.	Proj.	Viva	Total	Weightage (%) (if applicable)
1	Operate and maintain the hydroponic system	AGR/N0822 (v3.0)	Core	4	2	25	35			60	30	40		30	100	35
2	Carry out crop management in hydroponics system	AGR/N0857 (v1.0)	Core	4	2	20	40			60	30	40		30	100	30
3	Carry out harvesting, post-harvest management and marketing activities	AGR/N0823 (v3.0)	Core	4	2	30	30			60	30	40		30	100	25
4	Maintain health and safety at the workplace	AGR/N9903 (v3.0)	Non-Core	4	1	15	15			30	40	25		35	100	5
5	Employability Skills (60 Hours)	DGT/VSQ/N0102 (v1.0)	Non-Core	4	2	60				60	20	30			50	5
6	OJT				4			120		120						
Duration (in Hours) / Total Marks					13	150	120	120		390	150	175		125	450	100

Assessment - Minimum Qualifying Percentage

Please specify **any one** of the following:**Minimum Pass Percentage – Aggregate at qualification level:** 70 % (Every Trainee should score specified minimum aggregate passing percentage at qualification level to successfully clear the assessment.)**Minimum Pass Percentage – NOS/Module-wise:** ____% (Every Trainee should score specified minimum passing percentage in each mandatory and selected elective NOS/Module to successfully clear the assessment.)

Section 3: Training Related

1.	Trainer's Qualification and experience in the relevant sector (in years) <i>(as per NCVET guidelines)</i>	Certificate NSQF with specialization in hydroponics technician with 5 years of relevant industry experience in hydroponics* *Hydroponics Technician with 5 Years of experience with corporates/ NGO/ Hydroponics Entrepreneur and 10th Pass OR 12th Class (Biology Stream/ Elective Agriculture) with 5 years relevant industry experience in 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 OR Diploma (Agriculture/Horticulture) with 3 years of relevant industry experience in hydroponics OR Graduate (Agriculture /Horticulture / Botany/ Biotechnology/ Agriculture Engineering) with 1 year of relevant industry experience in hydroponics*** ***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) OR Post-Graduate (Agriculture/ Horticulture/ Botany/ Biotechnology) with 1 year of relevant industry experience in hydroponics
2.	Master Trainer's Qualification and experience in the relevant sector (in years) <i>(as per NCVET guidelines)</i>	5 years of training experience after Graduation (Agriculture /Horticulture / Botany/ Biotechnology/ Agriculture Engineering) with 1 year of relevant industry experience in hydroponics OR 5 years of training experience with Post-Graduate (Agriculture/ Horticulture/ Botany/ Biotechnology) with 1 year of relevant industry experience in hydroponics
3.	Tools and Equipment Required for Training	☒ Yes ☐ No <i>(If "Yes", details to be provided in Annexure)</i>
4.	In Case of Revised Qualification, Details of Any Upskilling Required for Trainer	NA

Section 4: Assessment Related

1.	Assessor's Qualification and experience in relevant sector (in years) <i>(as per NCVET guidelines)</i>	B.Sc. (Agriculture/ Botany/ Forestry/ Agronomy/ Horticulture and related streams) with 5 years of relevant industry experience in Agriculture/ Forestry/ Horticulture and related streams OR
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		M.Sc. (Agriculture/ Botany/ Forestry/ Agronomy/ Horticulture and related streams) with 2 years of relevant industry experience in Agriculture/ Forestry/ Horticulture and related streams OR PhD (Agriculture/ Botany/ Forestry/ Agronomy/ Horticulture and related streams) with 1 year of relevant industry experience in Agriculture/ Forestry/ Horticulture and related streams
2.	Proctor's Qualification and experience in relevant sector (in years) <i>(as per NCVET guidelines)</i>	Diploma/Graduate (It is mandatory for a proctor to have technical knowledge/IT knowledge Once a proctor has been on-boarded by any AA, they are oriented about skill ecosystem along with do's and don'ts .)
3.	Lead Assessor's/Proctor's Qualification and experience in relevant sector (in years) <i>(as per NCVET guidelines)</i>	M.Sc. (Agriculture/ Botany/ Forestry/ Agronomy/ Horticulture and related streams) with 10 years of relevant industry experience in Agriculture/ Forestry/ Horticulture and related streams and related experience
4.	Assessment Mode <i>(Specify the assessment mode)</i>	Offline
5.	Tools and Equipment Required for Assessment	☒ Same as for training ☒ Yes ☐ No <i>(details to be provided in Annexure-if it is different for Assessment)</i>

Section 5: Evidence of the need for the Qualification

Provide Annexure/Supporting documents name.

1.	Latest Skill Gap Study (not older than 2 years) (Yes/No): Yes
2.	Latest Market Research Reports or any other source (not older than 2 years) (Yes/No): No
3.	Government /Industry initiatives/ requirement (Yes/No): Yes
4.	Number of Industry validation provided: 10
5.	Estimated nos. of persons to be trained and employed: 2000
6.	Evidence of Concurrence/Consultation with Line Ministry/State Departments: Awaited, Letter sent on 24 February 2025 to JS MoAFW

Section 6: Annexure & Supporting Documents Check List

Specify Annexure Name / Supporting document file name

1.	Annexure: NCrf/NSQF level justification based on NCrf level/NSQF descriptors <i>(Mandatory)</i>	<i>Annexure-1</i>
2.	Annexure: List of tools and equipment relevant for qualification <i>(Mandatory, except in case of online course)</i>	<i>Annexure-2</i>

3.	Annexure: Detailed Assessment Criteria <i>(Mandatory)</i>	<i>Annexure-5</i>
4.	Annexure: Assessment Strategy <i>(Mandatory)</i>	<i>Annexure-6</i>
5.	Annexure: Blended Learning <i>(Mandatory, in case selected Mode of delivery is “Blended Learning”)</i>	NA
6.	Annexure: Multiple Entry-Exit Details <i>(Mandatory, in case qualification has multiple Entry-Exit)</i>	NA
7.	Annexure: Acronym and Glossary <i>(Optional)</i>	
8.	Supporting Document: Model Curriculum <i>(Mandatory – Public view)</i>	<i>Annexure-7</i>
9.	Supporting Document: Career Progression <i>(Mandatory - Public view)</i>	Hydroponics technician(L4), Horticulture Supervisor (Garden/Nursery/ Turf) (L5)
10.	Supporting Document: Occupational Map <i>(Mandatory)</i>	<i>Annexure-8</i>
11.	Supporting Document: Assessment SOP <i>(Mandatory)</i>	<i>Annexure-9</i>
12.	Any other document you wish to submit:	

Annexure 1: Evidence of Level

NCrF/NSQF Level Descriptors	Key requirements of the job role/ outcome of the qualification	How the job role/ outcomes relate to the NCrF/NSQF level descriptor	NCrF/NSQF Level
Professional Theoretical Knowledge/Process	Select the crop/ plant and site for hydroponic farming Propagate seedlings for hydroponic farming	A Hydroponics Technician grows plants in a controlled environment using alternative materials instead of soil as per the hydroponics farming method. The individual is also responsible for setting and maintaining a hydroponic farm apart from maintaining, harvesting and marketing the plants grown at the farm.	4
Professional and Technical Skills/ Expertise/ Professional Knowledge	Market the produce Maintain cleanliness and appropriate conditions Optimise resource utilisation Perform waste management Practice inclusion at work Administer appropriate emergency procedures Maintain the aeroponic farm	The job holder is expected to have knowledge to identify the common repair and maintenance needs, carry out regular repair and maintenance and co-ordinate with an expert for complex repair and maintenance needs, maintain the recommended temperature and humidity in the root chamber for the optimum growth of plants, maintain the recommended quantity of various nutrients in the nutrient spray solution, identify the signs of rotting, wilting, pests and disease in the plants and apply the appropriate treatment as per the prescription, maintain the record of any treatments and disinfectant used in the aeroponic farm, identify the market and buyers of the produce, maintain the record of sales and payments, maintain the recommended temperature in the hydroponic farm to prevent the growth of	4

		pests and pathogens, maintain the recommended levels of light in the hydroponic farm to prevent the growth of bacteria and algae, identify the signs of fungus and gnats and apply the appropriate treatment, install support for the vertical growth of plants and train them, prune the plants and their roots to ensure adequate aeration, optimise the usage of water/ electricity/ relevant materials in various tasks and processes, plug water leakages to prevent the wastage of water, segregate waste into appropriate categories, deposit the recyclable and reusable material, practice appropriate behaviour with all genders at work, follow the recommended inclusive practices for Persons with Disabilities (PwD), follow procedures for dealing with accidents, fires and emergencies, report details of first aid administered in accordance, use emergency equipment in accordance with manufacturer's specifications and workplace requirements	
Employment Readiness & Entrepreneurship Skills & Mind-set/Professional Skill	Set up the drip hydroponic system Market the produce Harvest and grade the produce Carry out harvesting activities Perform post-harvest management	The job holder is expected to check regularly and maintain the recommended Potential of Hydrogen (pH) and Electrical Conductivity (EC) levels in the reservoir, maintain the recommended temperature, dissolved oxygen and water levels in the nutrient solution reservoir, maintain the recommended ratio of various macro and micronutrients, change the water in the reservoir at the recommended intervals, aerate the water in the reservoir, use beneficial bacteria in the nutrient solution for the healthy growth of plants, carry out minor repair and maintenance of the hydroponic system and equipment, connect the drain line from the growing tray to the hole in the lid of the solution reservoir. fill in the growing tray with a well-draining growth medium, plant one plantlet in each of the grow pots and place them in the drain tray,, drill holes on the lid of the reservoir and connect the air tube,, install a manifold valve and connect each drip line from the manifold valve to the respective grow pots on the grow tray, test the functioning of the drip hydroponic system, arrange the necessary tools, equipment and accessories for harvesting and collecting the produce, harvest the produce following the recommended practices to protect it from damage and contamination, sort	4

		and grade the harvested produce on the relevant parameters, maintain the record of harvested and stored produce, dispose the produce unsuitable for consumption and marketing it, set up a reservoir to store the nutrient spray solution, install a submersible pump and PVC pipes to deliver nutrient spray solution, prepare the nutrient-solution maintaining the recommended ratio of water, nutrients and hormones required for the growth of plants, set up an automatic controller to automate the release of nutrient spray solution, test the automatic controller to ensure it triggers the spray at the set interval of time	
Broad Learning Outcomes/Core Skill	Set up the aeroponic farm Maintain the hydroponic system and plants/ crop Set up the hydroponic system	The job holder is expected to prepare the grow bed or containers for growing crops/ plants, germinate the seeds in the standard seed germination trays, ensure to keep the optimum hole size to be able to hold the germination trays, prepare the nutrient solution by adding the recommended nutrients to the water, maintain the adequate level of nutrient solution to ensure that crop/ plant roots don't go dry, prepare the solution reservoir, prepare the floater/ Styrofoam, fill in the reservoir tank with the nutrient solution, place the Styrofoam in the tank, ensuring to pass the air tubing through the relevant holes, maintain the wick hanging from the bottom of each pot long enough to allow it to go deep, turn on the air pump and maintain the crops/ plants following the recommended hydroponic wick system practices, prepare the frame with the appropriate material, install the frame in the growing area and set up plant hangers, place caps on the PVC pipe ends and apply PVC adhesive on them, drill holes in the PVC caps and install tubes to deliver water from the reservoir to the PVC pipes, install a submersible pump to pump water to the PVC pipes, set up the NFT reservoir in a dark space to prevent the growth of algae and maintain the quality of nutrients.	4

Responsibility	Setting and maintaining a hydroponic farm Harvesting and marketing the plants	A Hydroponics Technician grows plants in a controlled environment using alternative materials instead of soil as per the hydroponics farming method. The individual is also responsible for setting and maintaining a hydroponic farm apart from maintaining, harvesting and marketing the plants grown at the farm.	4
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Annexure 2: Tools and Equipment (Lab Set-Up)

List of Tools and Equipment

Batch Size: 30

S. No.	Tool / Equipment Name	Specification	Quantity for specified Batch size
1	Bluelab EC/pH/Temp Combo Probe	Nos	1
2	Face Masks	Nos	30
3	Rubber gloves	Nos	30
4	Video Recording Equipment	Nos	1
5	Coco Peat Low EC	Nos	12
6	pH Test Indicator	Set	1
7	Rose Can	Nos	1
8	Horticultural Poly Bags	Bundle	1
9	Seeds	gm	20
10	Measuring Spoon	Nos	1
11	Spray Nozzles	Nos	1
12	Neem Oil Spray	Nos	1
13	Insect Trap	Nos	1
14	Plant Nutrients	Nos	1
15	Sponge	Nos	1
16	Seedling Trays	Nos	10

Classroom Aids

The aids required to conduct sessions in the classroom are:

1. Whiteboard
2. Markers

Annexure 3: Industry Validations Summary

Provide the summary information of all the industry validations in table. This is not required for OEM qualifications.

S. No	Organization Name	Representative Name	Designation	Contact Address	Contact Phone No	E-mail ID	LinkedIn Profile (if available)
1	Post-Graduation Department of Agriculture	Dr. Randeep Kaur and Dr. Lavleen Kaur	Associate Professor and Assistant Professor	Amritsar	9915305271	lavleenkaur@khalsacollege.edu.in	
2	Rai Farms and Nursery	Ram Rai	Proprietor	Damtal, Kangra	9888135135		
3	Agri Joy Private Limited	Priyanshu Jain	Founder & CEO	Dehradun, UK	79064282293	priyanshu@agrijoy.in	
4	Alpha Advantech LLP	Nitin Lalit	Inventor	Karnal	7015437037	alphaplanter@gmail.com	
5	Amar Singh College	Sanjay Kumar Gupta	Dean Department of Agriculture	Bulandshahr		ascollegelkt@gmail.com	
6	KVA DAV College for Women	Sri Sung	Officiating Principal	Kurukshetra	0184-2252429	kvkdavw@gmail.com	
7	Post Graduate Department of Agriculture, Khalsa College	Dr. Randeep Kaur	Associate professor	Amritsar	99153305271	Lavleenkaur@khalsacollege.edu.in	
8		Dr. Lavleen Kaur	Assistant professor	Amritsar			
9	CAAFE	Dr. Sumit	General Manager	Lucknow	9889990102	Sumit.caafe@gmail.com	
10	Pathik Agrihorti solutions	Dr. Nirmal Kant	Director	Karnal	9588385619	pagrihortisolution@gmail.com	

Annexure 4: Training & Employment Details

Training and Employment Projections:

Year	Total Candidates		Women		People with Disability	
	Estimated Training #	Estimated Employment Opportunities	Estimated Training #	Estimated Employment Opportunities	Estimated Training #	Estimated Employment Opportunities
2024-25	500					
2025-26	500					
2026-27	1000					

Data to be provided year-wise for next 3 years

Hydroponics Technician

Training, Assessment, Certification, and Placement Data for previous versions of qualifications:

Qualification Version	Year	Total Candidates				Women				People with Disability			
		Trained	Assessed	Certified	Placed	Trained	Assessed	Certified	Placed	Trained	Assessed	Certified	Placed
	2022-23												
	2023-24												
3.0	2024-25	26	26	23	0	0	0	0	0	0	0	0	0

Applicable for revised qualifications only, data to be provided year-wise for past 3 years.

List Schemes in which the previous version of Qualification was implemented:

1. PMKVY

Content availability for previous versions of qualifications:

☒ Participant Handbook ☒ Facilitator Guide ☐ Digital Content ☐ Qualification Handbook ☐ Any Other:

Languages in which Content is available: Hindi and English

Annexure 5: Detailed Assessment Criteria

Detailed assessment criteria for each NOS/Module are as follows:

NOS/Module Name	Assessment Criteria for Performance Criteria/Learning Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
AGR/N0822: Operate and maintain the hydroponic system	Select the site for hydroponic farming	5	5		8
	PC1. select a location with the required temperature and sunlight exposure, suitable to the selected plant/ crop variety				
	PC2. ensure the availability of various inputs such as water, electricity, fertilisers and labour for hydroponic farming				
	PC3. prepare the tabulation of the crop, following the recommended process				
	Choose proper hydroponic system	10	15		10
	PC4. select the appropriate hydroponic technique for growing quality medium to obtain quality produce of the chosen crop				
	PC5. select an appropriate nutrient circulation method such as the Nutrient Film Technique, Deep Flow Technique (DFT), wick system, water culture, EBB and Flower etc				
	PC6. insert plants placed in plastic net pots, in the holes made in PVC pipes				
	PC7. use the recommended flooring material in the hydroponic farm, that is capable of soaking in any spillage and leakages				
	PC8. adopt the Nutrient Film Technique (NFT) for leafy plants for their faster growth (Selection of Hydroponics)				
	PC9. place plants in growing tubes and suspend them into water				
	PC10. maintain a reservoir to hold the nutrient solution and pump it as per the requirement to the tubes of growing plants as a back up				
	PC11. automate the nutrient flow system using the				

	cyclic monitoring application, as required				
	PC12. ensure the availability of adequate lighting for the optimum growth of plants in the hydroponic system through the use of a relevant lighting system				
	Maintain the hydroponic system	15	20		12
	PC13. check the pipes for any salt deposits and remove (cleaning of NFT channels /pipes) it safely to prevent choking and ensure the nutrient solution flows without obstruction through the pipes				
	PC14. check and ensure that the roots of plants get an appropriate quantity of nutrient solution for healthy growth				
	PC15. clean and monitor the condition of motors controlling water tanks, pumps, and growing trays				
	PC16. use clean water in the hydroponic system and maintain the pH level of the water by using the recommended treatment				
	PC17. clean the floor and maintain it dry in the hydroponic system				
	PC18. use mesh filters for regular cleaning				
	PC19. check the pH & EC regularly and follow the recommended practices to adjust it to the required level in the hydroponic system and nutrient solution, as required				
	PC20. use the oxygen meter with mobile application support and alarm to monitor the level of dissolved oxygen in the nutrient solution and follow the recommended practices to maintain or adjust it				
	PC21. clean the hydroponic system regularly using agriculture grade acid or other recommended treatment, and flush the system with clean water before replanting				
	PC22. use auto-cleaning systems for cleaning in large-scale hydroponic systems to save time and achieve better productivity				
	PC23. carry out artificial pollination using blowers,				

	and use mechanical vibrators to improve air quality within the protected hydroponic system structures				
	PC24. replace damaged parts or components as needed				
	NOS total	30	40		30
AGR/N0857 : Carry out crop management in hydroponics system	Prepare the growing medium	5	10		5
	PC1. select the appropriate growing medium, except soil for seed germination, ensuring the medium has the required characteristics such as moderate fertility, water holding capacity, good aeration capacity, etc.				
	PC2. use coco peat, rice husk to raise seedlings, avoiding the use of any medium to grow agronomical crops such as wheat, paddy, maize, barley, oat, etc. for nursery and fodder purposes				
	PC3. sterilize the growing medium before use, according to the applicable sterilization limit				
	Prepare seedlings for hydroponic farming	10	20		10
	PC4. select nursery containers for the growth of plants such as clay pots, plastic pots, or trays, as required				
	PC5. clean and sterilize the pots and trays before sowing seeds				
	PC6. choose appropriate crop according to the system				
	PC7. position the seeds appropriately on growing trays to prevent waterlogging in them				
	PC8. soak good quality seeds as per the requirement and use an appropriate time management technique to avoid over-soaking of seeds				
	PC9. apply the nutrient solution in the recommended quantity to the trays and pots and sow the seeds				
	PC10. use pest and disease-free seedlings, and planting material for the establishment of				

	hydroponic crops				
	PC11. maintain seedlings in the trays and pots for the recommended duration, protecting them from pests and disease and ensuring effective nutrient management				
	PC12. transplant the seedlings at the appropriate stage of their growth to be transplanted in the appropriate hydroponic system				
	Carry out irrigation and fertigation	8	5		8
	PC13. determine the amount of fertilizers to be used for fertigation based on the selected crop, its stages of growth, and the type of selected hydroponics technique				
	PC14. select the relevant fertigation technique for use, as appropriate				
	PC15. mix the appropriate fertilizers with the daily water requirement or by using a fertigation system/nutrient tank, according to the selected fertigation technique				
	PC16. follow fertigation schedule as per group growth stage				
	PC17. maintain the record of irrigation and fertigation of crop				
	PC18. ensure the required macro and micronutrients are available to plants and crops according to different stages of their growth				
	Monitor pests & diseases	7	5		7
	PC19. monitor the crops for any signs of pests and diseases and take appropriate remedial measures				
	PC20. implement integrated pest management (IPM) strategies.				
	PC21. use organic or chemical treatments as required	-	-	-	-
	NOS Total	30	40	-	30
AGR/N0823: Carry out harvesting, post-harvest	Carry out harvesting activities	12	14	-	12
	PC1. check the maturity of plants and crops for harvesting	-	-	-	-

management and marketing activities	PC2. carry out harvesting using the relevant tools and implements, ensuring minimum damage to crops/plants during harvesting	-	-	-	-
	PC3. discard any damaged or disfigured plants	-	-	-	-
	PC4. carry out sorting and grading on the basis of applicable parameters such as colour, appearance, ripeness, etc.				
	PC5. tag the harvested plants/ crop for identification				
	PC6. tag the harvested plants/crop for identification	-	-	-	-
	PC7. maintain the record of harvesting schedule and period of cultivation of crops/plants	-	-	-	-
	Perform post-harvest management	6	8	-	4
	PC8. store the harvested plants/crops in a dry storage area with the recommended temperature and humidity, ensuring hygiene and aeration	-	-	-	-
	PC9. use humidity monitors to monitor the humidity	-	-	-	-
	Market the produce	12	18	-	14
	PC10. track and analyse the information related to the wholesale and retail price of the produce	-	-	-	-
	PC11. identify the market and buyers of the produce such as e-trading platforms, cooperatives, local traders, exporters, etc.	-	-	-	-
	PC12. coordinate and negotiate with the potential buyers to secure a profitable price for the produce	-	-	-	-
	PC13. pack the produce in the appropriate packing material and label it with the relevant information	-	-	-	-
	PC14. arrange an appropriate mode of transport for safe and hygienic delivery of produce,	-	-	-	-

	ensuring optimum aeration during transit				
	PC15. coordinate with the transporter for safe and timely delivery to the buyer	-	-	-	-
	PC16. process the payment using the buyer preferred e-payment method	-	-	-	-
	PC17. maintain the manual and/ or electronic record of sales and payments using the physical registers and/ or the relevant computer system	-	-	-	-
	PC18. ensure compliance with the applicable regulations in the marketing of produce	-	-	-	-
	NOS Total	30	40	-	30
AGR/N9903: Maintain health and safety at the workplace	Maintain personal hygiene	10	5		10
	PC1. wash hands, legs and face with soap/alcohol based sanitizer at reasonable intervals				
	PC2. wash the worn clothes with soap and sun dry before use next time				
	PC3. ensure the face is covered with mask or three layers of cloth-piece				
	PC4. follow the workplace sanitization norms including distancing from sick people				
	Maintain clean and safe workplace	15	15		15
	PC5. carry out basic safety checks before operation of all tools, implements, and machinery and report identified hazards to the supervisor				
	PC6. wear appropriate Personal Protective Equipment (PPE) while performing work in accordance with the workplace policy				
	PC7. follow the instructions mentioned on the labels of chemicals/pesticides/fumigants etc to avoid hazards				
	PC8. assess risks prior to performing manual handling jobs, and work according to currently recommended safe practices				
	PC9. sanitize equipment, tools and machinery before and after use				

	PC10. use equipment and materials safely and correctly and return the same to designated storage after use				
	PC11. dispose waste safely and correctly in the designated area				
	PC12. recognize risks to bystanders and take required action to reduce the risks				
	PC13. work in a manner which minimizes environmental damage, ensuring all procedures and instructions for controlling risks are followed				
	PC14. report any accidents, incidents or problems without delay to an appropriate person and take necessary immediate action to reduce further danger				
	PC15. follow government / workplace advisories incase of outbreak of any disease/disaster				
	Administer appropriate emergency procedures	15	5		10
	PC16. follow procedures for dealing with accidents, fires and emergencies, including communicating location and directions to the location of emergency, as per the workplace requirements				
	PC17. use emergency equipment in accordance with manufacturer's specifications and workplace requirements				
	PC18. provide treatment appropriate to the patient's injuries in accordance with recognized first aid techniques				
	PC19. recover (if practical), clean, inspect/test, refurbish, replace and store the first aid equipment as appropriate				
	PC20. report details of first aid administered in accordance with workplace procedures				
	NOS Total	40	25	-	35
DGT/VSQ/N0102:	Introduction to Employability Skills	1	1	-	-
	PC1. identify employability skills required for jobs in various industries				

Employability Skills (60 Hours)	PC2. identify and explore learning and employability portals				
	Constitutional values – Citizenship	1	1	-	-
	PC3. recognize the significance of constitutional values, including civic rights and duties, citizenship, responsibility towards society etc. and personal values and ethics such as honesty, integrity, caring and respecting others, etc.				
	PC4. follow environmentally sustainable practices				
	Becoming a Professional in the 21st Century	2	4	-	-
	PC5. recognize the significance of 21st Century Skills for employment				
	PC6. practice the 21st Century Skills such as Self Awareness, Behaviour Skills, time management, critical and adaptive thinking, problem-solving, creative thinking, social and cultural awareness, emotional awareness, learning to learn for continuous learning etc. in personal and professional life				
	Basic English Skills	2	3	-	-
	PC7. use basic English for everyday conversation in different contexts, in person and over the telephone				
	PC8. read and understand routine information, notes, instructions, mails, letters etc. written in English				
	PC9. write short messages, notes, letters, e-mails etc. in English				
	Career Development & Goal Setting	1	2	-	-
	PC10. understand the difference between job and career				
	PC11. prepare a career development plan with short- and long-term goals, based on aptitude				

Communication Skills	2	2	-	-
PC12. follow verbal and non-verbal communication etiquette and active listening techniques in various settings				
PC13. work collaboratively with others in a team				
Diversity & Inclusion	1	2	-	-
PC14. communicate and behave appropriately with all genders and PwD				
PC15. escalate any issues related to sexual harassment at workplace according to POSH Act				
Financial and Legal Literacy	2	3	-	-
PC16. select financial institutions, products and services as per requirement				
PC17. carry out offline and online financial transactions, safely and securely				
PC18. identify common components of salary and compute income, expenses, taxes, investments etc				
PC19. identify relevant rights and laws and use legal aids to fight against legal exploitation				
Essential Digital Skills	3	4	-	-
PC20. operate digital devices and carry out basic internet operations securely and safely				
PC21. use e- mail and social media platforms and virtual collaboration tools to work effectively				
PC22. use basic features of word processor, spreadsheets, and presentations				
Entrepreneurship	2	3	-	-
PC23. identify different types of Entrepreneurship and Enterprises and assess opportunities for potential business through research				

	PC24. develop a business plan and a work model, considering the 4Ps of Marketing Product, Price, Place and Promotion				
	PC25. identify sources of funding, anticipate, and mitigate any financial/ legal hurdles for the potential business opportunity				
	Customer Service	1	2	-	-
	PC26. identify different types of customers				
	PC27. identify and respond to customer requests and needs in a professional manner.				
	PC28. follow appropriate hygiene and grooming standards				
	Getting ready for apprenticeship & Jobs	2	3	-	-
	PC29. create a professional Curriculum vitae (Résumé)				
	PC30. search for suitable jobs using reliable offline and online sources such as Employment exchange, recruitment agencies, newspapers etc. and job portals, respectively				
	PC31. apply to identified job openings using offline /online methods as per requirement				
	PC32. answer questions politely, with clarity and confidence, during recruitment and selection				
	PC33. identify apprenticeship opportunities and register for it as per guidelines and requirements				
	NOS Total	20	30		
	Total Marks	150	175		125

Annexure 6: Assessment Strategy

This section includes the processes involved in identifying, gathering, and interpreting information to evaluate the Candidate on the required competencies of the program.

1. 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 empanelled 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 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 empanelled assessment partners. Based on the results of assessment; ASCI will certify the learners/candidates

2. 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.

3. 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.

4. 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

5. *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 check on assessment quality and ensure assessment is carried out in fair and transparent manner
- Aadhar verification of candidates
- Evening Check (Post Assessment): 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.
- TP Calling: 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
- Video and Picture Evidence: 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.
- Surprise Visit: Time to time SSC/AA Audit team can visit the assessment location and do surprise audit for assessment process carried out by ground team.
- Geo Tagging: 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)

Annexure: Acronym and Glossary

Acronym

Acronym	Description
AA	Assessment Agency
AB	Awarding Body
ISCO	International Standard Classification of Occupations
NCO	National Classification of Occupations
NCrF	National Credit Framework
NOS	National Occupational Standard(s)
NQR	National Qualification Register
NSQF	National Skills Qualifications Framework
OJT	On the Job Training

Glossary

Term	Description
National Occupational Standards (NOS)	NOS define the measurable performance outcomes required from an individual engaged in a particular task. They list down what an individual performing that task should know and also do.
Qualification	A formal outcome of an assessment and validation process which is obtained when a competent body determines that an individual has achieved learning outcomes to given standards
Qualification File	A Qualification File is a template designed to capture necessary information of a Qualification from the perspective of NSQF compliance. The Qualification File will be normally submitted by the awarding body for the qualification.
Sector	A grouping of professional activities on the basis of their main economic function, product, service or technology.
Long Term Training	Long-term skilling means any vocational training program undertaken for a year and above. https://ncvet.gov.in/sites/default/files/NCVET.pdf