QUALIFICATION FILE

Green Hydrogen Plant Technician

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

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

NCrF/NSQF Level: 4

Submitted By:

Skill Council for Green Jobs

Chief Executive Officer
CBIP Building, Malcha Marg,
Chankyapuri, New Delhi – 110021
Contact no. and mail: 9899505533, ceo@sscgj.in

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Section 1: Basic Details

1.	**Qualification Name**	**Green Hydrogen Plant Technician**	
2.	**Sector/s**	**Environmental Science**	
3.	**Type of Qualification: ☒ New ☐ Revised ☐ Has Electives/Options ☐OEM**	**NQR Code & version of existing/previous qualification:** **NA**	**Qualification Name of existing/previous version:** **NA**
4.	**a. OEM Name** **b. Qualification Name** (Wherever applicable)	Green Hydrogen Plant Technician	
5.	**National Qualification Register (NQR) Code &Version**	**QG-04-ES-00146-2023-V1-SCGJ & version 1**	**6. NCrF/NSQF Level:** 4
7.	**Award (Certificate/Diploma/Advance Diploma/ Any Other**	Certificate	
8.	**Brief Description of the Qualification**	Green Hydrogen Plant Technician shall perform testing, installation and facility integration of electrolyser, repairs, troubleshooting, upkeep and maintenance of electrical control systems, protection systems, and other auxiliary equipment and associated tools in Green hydrogen generation facilities. The job holder will be responsible for the continuous supply of renewable power for its integration with the electrolysers and the other process equipment for generating Green Hydrogen. This role works closely with the power supply project, testing, plant engineering, process operation, control & operation across the green hydrogen generation plant.	

<table>
<tr><td>9.</td><td>Eligibility Criteria for Entry for Student/Trainee/Learner/Employee</td><td colspan="2">a. Entry Qualification & Relevant Experience:
<table>
<tr><th>S. No.</th><th>Specialization - if applicable)</th><th>Specialization - if applicable)</th></tr>
<tr><td>1</td><td>12th Grade</td><td>NA</td></tr>
<tr><td>2</td><td>Completed 2nd year of 3-year diploma (after 10th) and pursuing regular diploma</td><td>NA</td></tr>
<tr><td>3</td><td>10th grade pass plus 2-year NTC</td><td>NA</td></tr>
<tr><td>4</td><td>10th grade pass plus 1-year NTC plus 1 year NAC</td><td>NA</td></tr>
<tr><td>5</td><td>11th grade pass and pursuing continuous schooling</td><td>NA</td></tr>
<tr><td>6</td><td>10th Grade Pass</td><td>2 year relevant experience</td></tr>
<tr><td>7</td><td>Previous relevant Qualification of NSQF Level 3.0 with minimum education as 8th Grade pass</td><td>3 year relevant experience</td></tr>
</table>
b. Age: 18</td></tr>
<tr><td>10.</td><td>Credits Assigned to this Qualification, Subject to Assessment (as per National Credit Framework (NCrF))</td><td>14</td><td>11. Common Cost Norm Category:
I</td></tr>
<tr><td>12.</td><td>Any Licensing requirements for Undertaking Training on This Qualification (wherever applicable)</td><td colspan="2">NA</td></tr>
</table>

<table>
<tr><td>13.</td><td>Training Duration by Modes of Training Delivery (Specify Total Duration as per selected training delivery modes and as per requirement of the qualification)</td><td>☒Offline ☐Online ☐Blended
<table>
<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>Employability (Hours)</th><th>Total (Hours)</th></tr>
<tr><td>Classroom (offline)</td><td>160</td><td>140</td><td>60</td><td></td><td>60</td><td>420</td></tr>
<tr><td>Online</td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
</table>
(Refer Blended Learning Annexure for details)</td></tr>
<tr><td>14.</td><td>Aligned to NCO/ISCO Code/s (if no code is available mention the same)</td><td>NCO-2015/ 8131.2100
Ammonia Operator/Ammonia
Plant Operator</td></tr>
<tr><td>15.</td><td>Progression path after attaining the qualification (Please show Professional and Academic progression)</td><td>Vertical Progression: Supervisor-Green Hydrogen System/Green Hydrogen Plant Entrepreneur (Level 5)</td></tr>
<tr><td>16.</td><td>Other Indian languages in which the Qualification & Model Curriculum are being submitted</td><td>Nil</td></tr>
<tr><td>17.</td><td>Is similar Qualification(s) available on NQR-if yes, justification for this qualification</td><td>☐ Yes ☒ No</td></tr>
<tr><td>18.</td><td>Is the Job Role Amenable to Persons with Disability</td><td>☒ Yes ☐ No
If “Yes”, specify applicable type of Disability:
☒ Deaf ☒ Hard of Hearing ☒ Acid Attack Victims ☒ Dwarfism</td></tr>
<tr><td>19.</td><td>How Participation of Women will be Encouraged</td><td>The programme would be proposed to be incorporated in women ITIs and diploma colleges to train women candidates on the job role. TPs shall be encouraged to onboard at least a certain number of female candidates in each batch</td></tr>
</table>

20.	**Are Greening/ Environment Sustainability Aspects Covered** (Specify the NOS/Module which covers it)	☒ **Yes** ☐ **No**	
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** (In case of CS or MS, provide details of both Lead AB & Supporting ABs)	**Name: Arpit Sharma** **Email:** ceo@sscgj.in **Contact No.:** 9899505533 **Website:** https://sscgj.in/	
23.	**Final Approval Date by NSQC:** 31.01.2023	**24. Validity Duration:** 3 years	**25. Next Review Date:** 30.01.2026

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/NSQF 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.	SGJ/N0150: Introduce Green Hydrogen for clean energy transition	SGJ/N0150 Version 1	Core	4	1	20	10	60		30	30	20			50	9
2.	SGJ/N4012 : Identify components of Green Hydrogen Plant and interpret its layout	SGJ/N4012 Version 1	Core	4	1	20	10			30	30	20			50	9
3.	SGJ/N0156: : Integrate renewable power source for Green Hydrogen Production	SGJ/N0156 Version 1	Core	4	1	15	15			30	24	26			50	9
4.	SGJ/N0155: Perform installation of electrolyzer for green hydrogen generation	SGJ/N0155 Version 1	Core	4	2	30	30			60	50	50			100	19

S. No	NOS/Module Name	NOS/Module Code & Version *(if applicable)*	Core/ Non-Core	NCrF/NSQF 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)*
5.	SGJ/N0154: Analyze input water system to electrolyzer for Green hydrogen generation	SGJ/N0154 Version 1	Core	4	1	15	15	60		30	23	26			49	9
6.	SGJ/N0153: Operate Hydrogen conditioning and compression unit	SGJ/N0153 Version 1	Core	4	1	15	15			30	24	26			50	9
7.	SGJ/N0152: Set up and operate Hydrogen storage system	SGJ/N0152 Version 1	Core	4	1	15	15			30	24	26			50	9
8.	SGJ/N0151:Commissioning of Green Hydrogen system	SGJ/N0151 Version 1	Core	4	1	15	15			30	24	26			50	9
9.	SGJ/N0802: Maintain Health & Safety at Green Hydrogen generation project site	SGJ/N0802 Version 1	Core	4	1	15	15			30	24	26			50	9
10.	DGT/VSQ/N0102 EmployabilitySkills	DGT/VSQ/N0102 Version 1	Non-Core	4	2					60	20	30			50	9
11.	On the Job training				2					60						
Duration (in Hours) / Total Marks					14	160	140	60		420	273	276			549	100

Assessment - Minimum Qualifying Percentage

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.)*

Section 3: Training Related

1.	**Trainer's Qualification and experience in the relevant sector (in years)** *(as per NCVET guidelines)*	Graduate/Diploma (Electrical, Electronics, Civil, Mechanical, Fitter, Instrumentation) with Two years of experience in a petrochemical industries/Gasificationprocesses/relevant experience Or Certified under relevant Craft Instructor Training Scheme (CITS) course
2.	**Master Trainer's Qualification and experience in the relevant sector (in years)** *(as per NCVET guidelines)*	Engineering Graduate with 5 years of hydrogen production/management experience
3.	**Tools and Equipment Required for Training**	☒Yes ☐No (*If "Yes", details to be provided in Annexure)*
4.	**In Case of Revised Qualification, Details of Any Upskilling Required for Trainer**	Not Applicable

Assessment Related

1.	**Assessor's Qualification and experience in relevant sector (in years)** *(as per NCVET guidelines)*	Graduate/Diploma (Electrical, Electronics,Civil, Mechanical, Fitter, Instrumentation) with Three years of experience in a petrochemicalindustries/Gasification processes/relevant experience Or Certified under relevant Craft Instructor Training Scheme (CITS) course

2.	**Proctor's Qualification and experience in relevant sector (in years)** *(as per NCVET guidelines)*	Engineering Graduate with 6 years of experience in hydrogen production/Electrolyzer manufacturing/power system manufacturing
3.	**Lead Assessor's/Proctor's Qualification and experience in relevant sector (in years)** *(as per NCVET guidelines)*	Engineering Graduate with 7 years of experience in hydrogen production/Electrolyzer manufacturing/power system manufacturing
4.	**Assessment Mode** *(Specify the assessment mode)*	Online and offline both
5.	**Tools and Equipment Required for Assessment**	☒ Same as for training ☒ Yes ☐ No *(details to be provided in Annexure-if it is different for Assessment)*

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):** No published skills gap study is available across the green hydrogen value chain as this is relatively a new technology segment however a detailed training needs assessment study is planned to be implemented by SCGJ in coordination with The South Asia Regional Energy Partnership (SAREP) which is the flagship regional energy program of the United States Agency for International Development (USAID).
2.	**Latest Market Research Reports or any other source (not older than 2 years) (Yes/No):** Yes following key documents are available in the public domain a. National Green Hydrogen Mission: https://mnre.gov.in/img/documents/uploads/file_f-1673581748609.pdf b. https://powermin.gov.in/sites/default/files/Green_Hydrogen_Policy.pdf c. Harnessing Green Hydrogen, NITI Aayog: https://www.niti.gov.in/sites/default/files/2022-06/Harnessing_Green_Hydrogen_V21_DIGITAL_29062022.pdf d. https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2020/Dec/IRENA_Green_hydrogen_cost_2020.pdf?rev=4ce868aa69b54674a789f990e85a3f00
3.	**Government /Industry initiatives/ requirement (Yes/No):** Yes, The global energy sector is on a path of rapid decarbonization and green hydrogen is poised to play a vital role for this transformation in energy systems,Scaling up green hydrogen production and utilisation across multiple sectors like power generation, transportation and other hard to abate sectors will be essential to helping global economies achieve net zero emissions and limit global temperature rises to 1.5C. Many major economies including India have declared Green Hydrogen roadmap as part of the climate and clean energy related

	actions. These measures largely seek to address the technical and financial challenges in scaling up Green Hydrogen generation, enhancing Green Hydrogen use across focus sectors, developing scalable technologies supported by enabling policies and regulations. After the announcement of the National Green Hydrogen Mission by the Prime Minister in August 2021, there has been a serious push on both policy and industry actions on green hydrogen. Leading energy companies including NTPC, Reliance and Adani Group along with several other major companies have forayed into this segment and have already announced mega green hydrogen projects. Cabinet has very recently approved the National Green Hydrogen mission with an aim to make India a leading producer and supplier of Green Hydrogen in the world. Government of India is set to provide a fillip to the renewable energy sector by making green hydrogen significantly cheaper while also supporting the nascent industry to establish global supply chains. With the National Mission, there is clear focus on government funding and support for R&D, measures for demand creation, financial support for manufacturing and infrastructure development along with creating opportunities for employment and economic development. The Mission targets setting up of at least 5 MMT (Million Metric Tonne) per annum of green hydrogen capacity with an associated renewable energy capacity of about 125 GW by 2030. The targeted production capacity will bring over ₹8 lakh crore in total investments and will result in creation of over 6 lakh clean jobs. Implementation of the Mission is expected to create a large-scale ecosystem for Green Hydrogen production and use in the country which would also provide a huge opportunity for skilling and jobs creation. In alignment with the Mission targets, SCGJ is actively consulting with Key stakeholders like Green hydrogen industry which includes renewable energy developers, electrolyzer manufacturers, Green hydrogen generators etc to identify their evolving skilling requirement and accordingly designing and implementing skilling interventions to ensure that trained and certified candidates are readily available for the industry.
4.	**Number of Industry validation provided:** 10 leading companies including solar developers, Electrolyzer manufacturers, project developers who have made recent announcements for Green Hydrogen/Ammonia generation projects.
5.	**Estimated nos. of persons to be trained and employed:** Up to 6 lakhs new jobs are expected to be created by 2030 across the Green hydrogen value chain as per the Green Hydrogen Mission. Multiple qualifications across the key segments of the green hydrogen value chain shall be developed as per the requirement of the industry. It is expected that up to 25000 technicians shall be trained and gradually employed across new projects every year. Considering that the domestic industry is at a very nascent stage currently and the most of the Green hydrogen generation units in the country as recently announced are mainly under planning stage, targeted skilling activities can be undertaken for priority job roles like for technicians who would set up and operate green hydrogen production system. Over 4 lakhs jobs are expected to be generated only for meeting the required renewable energy capacity of 125 GW which would be required for powering the Green hydrogen facilities producing at least 5 MT per annum till 2030. SCGJ already has a portfolio of qualifications for performing key installation and O&M functions in various renewable energy projects and it is expected that the new green hydrogen investments will further drive the required skilling and employment opportunities across renewable energy domain. In the short and medium term, Industry will lead the way and Green Hydrogen production plant will also generate significant jobs across plant installation, commissioning and O&M functions along with various other technical and non technical roles at various levels. Upstream process including storage, handling, distribution, applications across industries will generate new jobs and Technicianial opportunities supported with the strong policy framework for the green hydrogen ecosystem, along with the robust standards and regulations framework for the sector.

	In the medium to long term, innovative business models particularly in transport and power sectors will evolve in the coming decade leading to new opportunities for both jobs and self- employment across various industry clusters. Oil refineries using hydrogen for desulphurisation, ammonia production for fertilisers and chemicals industry, treatment of basic metals along with steel industry will create the leading market, skilling and employment opportunities for green hydrogen in the short-medium term. Green hydrogen technologies and applications as alternate energy carrier / vector for industrial process heating, transportation and long duration energy storage will also emerge in the long term possibly creating new opportunities for both skilling and employment.
6.	**Evidence of Concurrence/Consultation with Line Ministry/State Departments:** Concurrence has been requested from the Ministry of New and Renewable Energy

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 *(Mandatory)*	Annexure: Evidence of Level
2.	**Annexure:** List of tools and equipment relevant for qualification *(Mandatory, except in case of online course)*	Annexure: Tools and Equipment (Lab Set-Up)
3.	**Annexure:** Detailed Assessment Criteria *(Mandatory)*	Annexure: Detailed Assessment Criteria (Mandatory)
4.	**Annexure:** Assessment Strategy *(Mandatory)*	Annexure: Assessment Strategy
5.	**Annexure:** Acronym and Glossary *(Optional)*	Annexure: Acronym and Glossary
6.	**Supporting Document:** Model Curriculum *(Mandatory – Public view)*	Attached
7.	**Supporting Document:** Career Progression *(Mandatory - Public view)*	Annexure: Career progression and OM
8.	**Supporting Document:** Occupational Map *(Mandatory)*	Annexure: Career progression and OM
9.	**Supporting Document:** Assessment SOP *(Mandatory)*	Annexure: Assessment Strategy

Annexure: Evidence of Level

Title/Name of qualification/component: Green Hydrogen Plant Technician			**Level: 4**
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	The individual is expected to perform testing, installation and facility integration of electrolyzer, repairs, troubleshooting, upkeep and maintenance of electrical control systems, protection systems, and other auxiliary equipment and associated tools in Green hydrogen generation facilities. The job holder will be responsible for the continuous supply of renewable power for its integration with the electrolyzer and the other process equipment for generating Green Hydrogen.	The green hydrogen plant technician would have a knowledge of the complete process in producing green hydrogen. He needs to know various sub sections of the plants and their operations. He/She have to demonstrate technical skills required for performing and accomplishing installation of various critical components of the plant. He/She has to be multidisciplinary and have knowledge and skills of installation of hydrogen production plant. The Job holder is expected to exhibit well developed skills with a limited choice of procedures in familiar context. He/she should understand technical features for various sub components. He will perform proper installation of green hydrogen plant. He/she has a capability of coordinating with Junior technician/Helper for installing the plant. Thus, considering the scope of work the job holder can be placed at Level 4. Since the individual's work is not limited to working in familiar, routine & predictable environment but rather encompasses jobs that requires working in limited routine and predictable environment involving setting up various	4

Title/Name of qualification/component: Green Hydrogen Plant Technician		Level: 4	
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**
		components of a plant providing relevant solutions and assisting Supervisor ensuring the proper installation and commissioning of solutions, etc., s/he can't be placed in Level 3. And as the individual doesn't require to accomplish wide range of activities and working around non-standard practices, the roles does not qualify as a level 5 role.	
Professional and Technical Skills/ Expertise/ Professional Knowledge	The individual is expected to exhibit the basic knowledge of producing green hydrogen through electrolysis including operation and maintenance of various sub components such as water treatment plant, electrolyzer and storage of hydrogen. He/She needs to have skills to set up multiple components of Green Hydrogen plant.	The Technician is expected to exhibit **knowledge of facts such as properties of hydrogen, functioning of electrolyser, gas piping, storage etc.** He/she should have general concepts of physical and chemical properties of green hydrogen and how to safely handle the gas. S/he should possess the ability to speak, read and write in the local vernacular language and English which is always preferred. Thus considering the professional knowledge, s/he can be placed at level 4. The Job holder is expected to possess professional skils more than just factual knowledge about various components of green hydrogen plant but also knowledge of principles such as demonstration procedures,	4

Title/Name of qualification/component: Green Hydrogen Plant Technician			**Level: 4**
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**
		installation and maintenance procedures and general concepts such as tools and testing equipment used etc. Therefore s/he can't be placed at Level 3 Since the job holder doesn't require to exhibit factual & theoretical knowledge in contexts within hydrogen value chain such as evolving technological trends in sub components only and their impact on hydrogen production, etc. but knowledge specific to green hydrogen production, the role can't be placed at level 5	
Employment Readiness & Entrepreneurship **Skills & Mind-set/Professional Skill**	The individual is expected to plan & organize the schedule for all installations and related activities to be undertaken by self or by the team. Further s/he must be able to take decisions on a regular basis, manage relationship with colleagues and apply domain knowledge to perform tasks related to green hydrogen applications. S/he is also expected to critically evaluate information obtained from the manufacturer and teams to create relevant solutions.	The Job holder is expected to possess a range of practical and cognitive skills required to accomplish tasks and solve problems by selecting and applying basic methods and tools and install systems and provide post installation support. The job holder also has to ensure preparation of effective installation plan for setting up green hydrogen plant. Thus, considering the professional skills the job holder can be placed at Level 4. Since the Green Hydrogen Plant Technician is expected to exhibit cognitive skills along with practical skills required to accomplish the tasks and solve problems by identifying plant needs and preparing solutions, identifying problems in installations, etc. s/he can't be placed at Level 3.	4

Title/Name of qualification/component: Green Hydrogen Plant Technician			**Level: 4**
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**
		And as the job holder is not expected to possess practical and cognitive skills required to generate solutions for specific problems related to hydrogen energy, but rather expected to generate solutions specific to green hydrogen plant, s/he can't be placed at level 5	
Broad Learning Outcomes/Core Skill	The individual is expected to exhibit fluent communications skills, networking skills with fellow Technician & is capable of understanding the need of fellow Technician.	The Job holder is expected to be possess the technical capabilities for preparing the installation plan and its execution for hydrogen production, etc., interact effectively with Technician, skill of collecting and organizing information for them, understanding requirements of the local site to prepare solutions, etc. and communication skill for so as to interact effectively with fellow technician. Thus, considering the core skills, s/he can be placed at Level 4. The Job holder is expected to exhibit core skills more than language to communicate with required clarity, basic algebraic and arithmetic skill and basic understanding of socio- political environment. For example, s/he is supposed to organize and collect information regarding the local energy usage practices through discussions, etc.,	4

Title/Name of qualification/component: Green Hydrogen Plant Technician			**Level: 4**
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**
		And since the job holder requires only some skill of collecting and organizing information but doesn't need to be reasonably good and only the desired mathematical skill restricted to the production plant, s/he can't be placed at Level 5.	
Responsibility	The individual is primarily responsible for installation of green hydrogen plant along with thorough monitoring of the plant performance and ensuring proper maintenance of plant equipment to ensure optimum service delivery.	Green Hydrogen Technician is responsible for his/ her own work as s/he has to ensure installation of Green hydrogen plant through identification of suitable skills. updating self with industry trends and skills and to an extent influence subordinate's works and learning as s/he is responsible for passing knowledge and skills to his/ her team of Junior technicians and helpers. Considering the responsibilities, the individual can be placed at level 4. Since the Job holder responsibility is not limited till his/her own work & learning but also encompasses some responsibilities for others learnings as s/he is expected to ensure knowledge transfer to team members s/he can't be placed at 3. As the number of people reporting to him/her may be less and the individual may not have large teams working across multiple functions, s/he can't be placed at level 5.	4

Annexure: Tools and Equipment (Lab Set-Up)

List of Tools and Equipment

Batch Size:30

S.No	Equipment Name	Specification	Qty
1	Earth tester	Nos	1
2	Do's and Don't for Personal safety as per OISD/PESO Guideline (Chart)	No	2
3	Do's and Dont's (Chart) for Green Hydrogen Production Plant handling (Material safety)	No	2
4	Flammable Gas Detector (Hydrogen Sniffer)	Nos	1
5	Helmets/hard hats	Nos	10
6	Tools required for laying water pipelines and associated plumbing accessories	Nos	1
7	Hand driven Megger	Nos	1
8	Screw driver	Nos	3
9	Hammer	Nos	2
10	White Board	Nos	1
11	projector	Nos	1
12	flame proof aprons	Nos	2
13	Safety Gloves	Pair	10
14	Laptop	Nos	1
15	Safety goggles	Pair	10
16	small rectifier for demonstration	Nos	1
17	TDS meter	Nos	2
18	Display list of emergency contact numbers	Nos	1
19	Small size/demonstration/dummy units of electrolyser with solar/RE power plant	Nos	1
20	Hydrogen Pressure Gauge (Portable Hydrogen Pressure detector)	Nos	1
21	Wire Cutters	Nos	3
22	Torque Wrenches / Socket Wrench (Ratchet Set)	Nos	5
23	Flow Charts, GH2 Plant Layout,GH2 Application Chart	Nos	5
24	Ph meter	Nos	2
25	Digital Multimeter	Nos	3
26	Digital Clampmeter	Nos	5

27	fire extinguishers	Nos	1
28	First aid KIT	Nos	3
29	Stripping & Crimping Tools	Nos	3
30	Nose pliers	Nos	3
31	Side cutting pliers	Nos	3
32	Combination pliers	Nos	3
33	Double ended ring spanner	Nos	3
34	Double ended flat spanner	Nos	3
35	IR Thermometer	Nos	3
36	Frequency meter	Nos	1

Classroom Aids

The aids required to conduct sessions in the classroom are:

Marker, chart and visual aid; Colour code nomenclature chart of Hydrogen, Hydrogen production flowchart, Hydrogen supply chain flow chart ,Schematics of Green hydrogen production plant;

Annexure: 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	M/s Oriana Power Private Limited	Mr Rupal Gupta	Director	C-103,1st floor, Sec-2,Noida, UP-201301	9910116446	rupal.gupta@orianapower.com	N/A
2	IB Solar	Mr Abhinav Mahajan	Director	D-127, sec-63 Noida 201301	9810012731	abhinav@ibsolar.co.in	N/A
3	IWTMA	Mr DV Giri	SG	C-1, 2nd Floor, Soami Nagar New Delhi-110 017, India	9962974711	secretarygeneral@indianwindpower.com	N/A
4	SolarTech Saarthi Pvt Ltd	Mr Lucky Aggarwal	MD	A-6/49, Sector 17, Rohini, Delhi 110089	9711851306	lucky.solarsaarthi@gmail.com	N/A
5	REVY	Dr Vanita Prasad	CTO	313-314, Siddharth Upscale, Vasna Road Vadodara-390007, Gujarat, India	8156009652	vanita.prasad@revy.co.in	N/A
6	GRI	Dr Kirubakran	Assoc Professor & Director	The Gandhigram Rural Institute Gandhioram 624 302 Tamilnadu	94438 59066	kirbakaran@yahoo.com	N/A
7	Uneecops- GH2 Solar	Mr Anurag Jain	Director	5th Floor, Q Tower, A-8, Block A, Sector 68, Noida, Uttar Pradesh 201301	98970 38232	anurag.jain@uneecops.com	N/A
8	Innodust	Mr S K Sahoo	Director	Plot no.-A/63/1,Saheed Nagar, Bhubaneswa-751007	7894412585	Sunil.innodust@gmail.com	N/A
9	Bharat Heavy Electricals Limited,	Dr S R Awasthi	GM(Retd), BHEL	M-269 Gautam Nagar Bhopal-462023C-103,1st floor, Sec-2,Noida, UP-201301	9407530129	srawasthi269@gmail.com	N/A
10	Gujarat Institute of Solar Energy	Ms Dipti Shah	Director	1St Floor, Giriraj Complex, Opp. Bank of Baroda, Near Sardar Patel Statue, Naranpura, Ahmedabad ― 380013, Gujarat, India.	9898167732	info@gise.in	N/A

Annexure: 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
2024-2025	250	25	50	5	25	5
2025-2026	250	25	50	5	25	5
2025-2027	250	25	50	5	25	5

Data to be provided year-wise for next 3 years

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
NA	-	-	-	-	-	-	-	-	-	-	-	-	-
NA	-	-	-	-	-	-	-	-	-	-	-	-	-

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. NA

Content availability for previous versions of qualifications:

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

Languages in which Content is available: English

Annexure: Blended Learning

Blended Learning Estimated Ratio & Recommended Tools:

Refer NCVET "Guidelines for Blended Learning for Vocational Education, Training & Skilling" available on:
https://ncvet.gov.in/sites/default/files/Guidelines%20for%20Blended%20Learning%20for%20Vocational%20Education,%20Training%20&%20Skilling.pdf

S. No.	Select the Components of the Qualification	List Recommended Tools – for all Selected Components	Offline : Online Ratio
1	☒Theory/ Lectures - Imparting theoretical and conceptual knowledge	NA	60:40
2	☒Imparting Soft Skills, Life Skills, and Employability Skills /Mentorship to Learners	NA	
3	☒Showing Practical Demonstrations to the learners		
4	☒Imparting Practical Hands-on Skills/ Lab Work/ workshop/ shop floor training		
5	☒Tutorials/ Assignments/ Drill/ Practice		
6	☒Proctored Monitoring/ Assessment/ Evaluation/ Examinations		
7	☒On the Job Training (OJT)/ Project Work Internship/ Apprenticeship Training		

Annexure: Detailed Assessment Criteria

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

<table>
<tr><th>NOS/ModuleName</th><th>Assessment Criteria for Performance Criteria/Learning Outcomes</th></tr>
<tr><td>SGJ/N0150: Introduce green hydrogen for clean energy transition</td><td>
<table>
<tr><th>Assessment Criteria for Outcomes</th><th>Theory Marks</th><th>Practical Marks</th><th>Project Marks</th><th>Viva Marks</th></tr>
<tr><td>Fundamental concepts of Green Hydrogen</td><td>20</td><td>13</td><td>-</td><td>-</td></tr>
<tr><td>PC1. Explain the necessity of green hydrogen in sustainable energy transition</td><td>2</td><td>-</td><td>-</td><td>-</td></tr>
<tr><td>PC2. Discuss the properties and characteristics of Hydrogen</td><td>2</td><td>-</td><td>-</td><td>-</td></tr>
<tr><td>PC3. Describe basic concepts of Hydrogen as an energy carrier</td><td>2</td><td>-</td><td>-</td><td>-</td></tr>
<tr><td>PC4. Demonstrate with chart colour code nomenclature of Hydrogen</td><td>-</td><td>3</td><td>-</td><td>-</td></tr>
<tr><td>PC5. Perform an activity for matching the process and source of production as applicable for different colour codes of hydrogen</td><td>-</td><td>4</td><td>-</td><td>-</td></tr>
<tr><td>PC6. Discuss the value chain for Green Hydrogen</td><td>3</td><td>-</td><td>-</td><td>-</td></tr>
<tr><td>PC7. Discuss briefly various technology options for production of green hydrogen and outline benefits and drawbacks of existing methods of Hydrogen production</td><td>3</td><td>3</td><td>-</td><td>-</td></tr>
<tr><td>PC8. Briefly discuss the end use applications of Green hydrogen in industry, transport and power production.</td><td>3</td><td>-</td><td>-</td><td>-</td></tr>
<tr><td>PC9. Draw a flow diagram of green hydrogen production, conversion and end uses across the energy system</td><td>-</td><td>3</td><td>-</td><td>-</td></tr>
<tr><td>PC10. Discuss key aspects and challenges related to production, storage, transportation, distribution of Green Hydrogen.</td><td>3</td><td>-</td><td>-</td><td>-</td></tr>
<tr><td>PC11. Discuss various renewable energy sources for large scale production of green hydrogen through electrolysis of water</td><td>2</td><td>-</td><td>-</td><td>-</td></tr>
<tr><td>Skills Required for the Green Hydrogen Economy</td><td>10</td><td>7</td><td>-</td><td>-</td></tr>
</table>
</td></tr>
</table>

PC12. Discuss Green hydrogen economy in Indian context along with the key aspects of Green Hydrogen Policy and Mission of Government of India	3	-	-	-
PC13. Show how green hydrogen economy is critical for energy transition and the key policy measures announced by the Government of India	2	4	-	-
PC14. Illustrate key announcements made by the leading private and public sector companies across the value chain of Green hydrogen and outline how those would create new opportunities for technicians.	3	3	-	-
PC15. Discuss the role and responsibilities of the job holder	2	-	-	-
NOS Total	**30**	**20**	**-**	**-**

SGJ/N4012: Identify componentsof Green Hydrogen Plant and interpret its layout	

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Key Green Hydrogen system components	**16**	**12**	-	-
PC1. Identify all key components of the Green Hydrogen plant including electrical, mechanical and civil components	3	2	-	-
PC2. Illustrate the schematic of Green hydrogen production plant	1	3	-	-
PC3. Discuss functions of the key components including of electrolyzer stacks, renewable power supply system, , feed water supply and demineralisation system, gas separator, transformer and rectifier, gas compression unit, etc	3	2	-	-
PC4. Illustrate key components of the plant and outline their functions through plant schematic	2	2	-	-
PC5. Discuss fundamental principles of main components on which they operate (e.g. electrolyzer stack, gas collector, power source, etc.)	3	-	-	-
PC6. Discuss briefly on types of electrolysers	4	-	-	-
PC7. Illustrate possible combination of various renewable power sources for generating green hydrogen	-	3	-	-
Plant Layout	**14**	**8**	-	-
PC8. Explain overall layout of the plant	3	2	-	-
PC9. Illustrate how to interpret the Plant Layout including various equipment and material used in a Green hydrogen production facility.	-	2	-	-
PC10. Discuss Sparking items e.g. MCBs, switches to be installed isolated from the hydrogen production area	2	-	-	-
PC11. Explain how to read and interpret electrical and other applicable codes, standards and protocols relevant to the plant.	3	-	-	-

PC12. Explain key material and safety codes, Technology protocols and standards as applicable in Green hydrogen industry	3	-	-	-
PC13. Demonstrate how to interpret signs, notices and/or cautions at project site.	2	3	-	-
PC14. Identify processes where energy/electricity and material utilization can be optimized	1	1	-	-
NOS Total	**30**	**20**	**-**	**-**

SGJ/N0156: Integrate renewable power sources for Green Hydrogen Plant

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Flexible System Operation	**24**	**26**	**-**	**-**
PC1. Discuss the key parameters of renewable and hybrid power plants	3	-	-	-
PC2. Explain how cost effective and reliable Renewable Power can be assured for the production of Green Hydrogen	4	-	-	-
PC3. Illustrate how reliable renewable power can be supplied through integrating various renewable energy sources for generating green hydrogen	-	4	-	-
PC4. Discuss the flexible system operation for the supply of power from different sources	4	1	-	-
PC5. Show how integration of variable renewable energy (VRE) for powering electrolyzer are performed	1	3	-	-
PC6. Discuss how Sizing of renewable power plant along with storage capacity is critical to meet hydrogen load demand	3	3	-	-
PC7. Show how to calculation of hydrogen production equipment load	1	4	-	-
PC8. Discuss functions of transformers and rectifiers	2	1	-	-
PC9. Show how rectifiers operate to cater the load of electrolyzer	2	4	-	-
PC10. Explain and illustrate key aspects of Maintaining stability of power supply for the green hydrogen plant, switching of number of electrolyser cells as per availability of electric power, etc	3	3	-	-
PC11. Illustrate the process of splitting water into hydrogen and oxygen using renewable electricity	1	3	-	-
NOS Total	**24**	**26**	**-**	**-**

SGJ/N0155: Perform installation of electrolyzer for green hydrogen generation

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Installation of Electrolyzers -I	**30**	**20**	**-**	**-**
PC1. Discuss the types of Electrolyzer including Polymer Electrolyte Membrane (PEM), Alkaline electrolysis (AE), Solid Oxide Electrolysis (SOEC), Anion Exchange Membranes (AEM) and the status of their technology maturity	2	2	-	-
PC2. Explain the key technical specifications of various Electrolyzer types (PEM, AE AEM, SOEC) including capacity and sizing	4	-	-	-
PC3. Illustrate different types of electrolyzer and their key specifications and technical parameters through Pictures, videos, product data sheet etc	1	4	-	-
PC4. Provide an overview of various electrolyzer along with their key features and comparison	2	2	-	-
PC5. Outline differences in PEM, AE, AEM and SOEC Electrolyzer and illustrate their schematics	2	3	-	-
PC6. Explain the major components of an Electrolyzer	2	-	-	-
PC7. Discuss the Operating principles of PEM AE and SOEC electrolyzer	2	-	-	-
PC8. Discuss and show how to Identify suitable tools and equipment required for Installation of electrolyzer, Plant & Machineries conforming to relevant technical sheets, safety and technical standards for proper execution of work	3	4	-	-
PC9. Explain the inputs / outputs of an Electrolyzer system	3	1	-	-
PC10. Explain key O&M requirements for electrolyzer	3	-	-	-
PC11. Discuss basic Technical specifications of electrolyser of each cell	3	-	-	-

PC12. Discuss and Illustrate how to perform calculation for estimating losses and equipment efficiency	3	4	-	-
Installation of Electrolyzers- II	**20**	**30**	**-**	**-**
PC13. Discuss how to read and interpret drawings, Mechanical and electrical diagrams along with Plant specifications	2	-	-	-
PC14. Explain how to install the plant using design drawings and documents provided	2	-	-	-
PC15. Show how to handle different tools, equipment as per concerned standard and industry practices	-	2	-	-
PC16. Show how to implement the procedure for electrolyzer stack assembly and operations	-	2	-	-
PC17. Discuss in detail the input renewable power from various sources and its integration with electrolyzer	2	3	-	-
PC18. Discuss the assembly/Installation of Parts and Components of Electrolyzer	2	-	-	-
PC19. Show how to perform requisite data and document management	-	2	-	-
PC20. Discuss step by step process for assembly/Installation of Electrolyzer- Bipolar plate, separator(membrane), Porous Transport layer, electrodes etc.	2	-	-	-
PC21. Show how to get familiar with mechanical/electrical systems for system installation, troubleshooting and commissioning work	-	3	-	-
PC22. Discuss how to perform stack assembling, testing, operation, maintaining and troubleshooting of an electrolyzer	2	2	-	-
PC23. Show how to ensure that design guidelines and relevant engineering codes and standards are rigorously followed for installation, commission and maintenance of the electrolyzer	-	3	-	-

PC24. Discuss how to perform stack assembling, testing, operation, maintaining and troubleshooting of an electrolyzer	2	-	-	-
PC25. Show how to perform assembling, testing, maintaining and troubleshooting of an electrolyzer	-	3	-	-
PC26. Discuss Key selection parameters of electrolysis including density, pressure, operating temperature, hydrogen purity, Export component and Volume and weight	2	-	-	-
PC27. Discuss the importance of Manifold and sealing.	2	-	-	-
PC28. Explain how to Maintain the log for daily operation of electrolyzer	-	1	-	-
PC29. Explain Start up, shutdown, and operate the production processes	2	3	-	-
PC30. Show how to monitor various parameters of electrolysis	-	3	-	-
PC31. Demonstrate how to support in performing process controls functions in conjunction with overall project engineering and other functional teams	-	3	-	-
NOS Total	**50**	**50**	**-**	**-**

SGJ/N0154: Analyze input water system to electrolyzer for green hydrogen generation

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Analyse Input water system	**23**	**26**	**-**	**-**
PC1. Explain and illustrate the schematic of input water system for electrolyzer along with the operation of the system	2	3	-	-
PC2. Explain and illustrate the various processes for treating the water supply for feedstock purpose	3	4	-	-
PC3. Discuss various parameters essential for water as feedstock	2	-	-	-
PC4. Discuss and Show how the tools and tackles are utilised to set up and operate the feed water system	2	4	-	-
PC5. Discuss Selection of water quality for hydrogen production	3	1	-	-
PC6. Discuss how to monitor the quality of water feedstock for input to the electrolyzer	3	2	-	-
PC7. Explain and illustrate the layout of piping system for supply of water to electrolyzer	2	3	-	-
PC8. Explain and show how to install the Piping and Piping accessories for supplying controlled quantity of water to the electrolyzer using level controller etc.	2	2	-	-
PC9. Discuss and show how to record results, organize data, and perform basic computations to set up and operate input water system	1	4	-	-
PC10. Explain do's and don'ts in installation of water supply unit and its piping and joints	3	3	-	-
NOS Total	**23**	**26**	**-**	**-**

SGJ/N0153: Operate Hydrogenconditioning and compression unit Plant Technician

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Hydrogen Conditioning	**9**	**9**	**-**	**-**
PC1. Explain the process of conditioning/purification of green hydrogen	2	2	-	-
PC2. Explain De-Oxo System	2	-	-	-
PC3. Explain Dryer System	2	-	-	-
PC4. Show how to undertake Installation and interconnection of major equipment for hydrogen conditioning system along with other balance of plant	-	2	-	-
PC5. Show how to perform selection and sizing of hydrogen tank	-	1	-	-
PC6. Discuss and show how to set up and operate the hydrogen conditioning system	1	2	-	-
PC7. Discuss other key balance of plants components	2	2	-	-
Hydrogen Compression	**15**	**17**	**-**	**-**
PC8. Explain compression process	2	-	-	-
PC9. Discuss the precautions required to compress hydrogen	2	-	-	-
PC10. Show the functions of Green hydrogen compression system	-	2	-	-
PC11. Show how the compression system is set up	-	3	-	-
PC12. illustrate the key challenges in compression	-	2	-	-
PC13. Explain about H2 compression types such as reciprocating, ionic & diaphragm.	2	-	-	-
PC14. Discuss the precautions required to compress hydrogen	2	2	-	-
PC15. Explain and Show how to perform the required safety procedures as per industry standard	1	1	-	-

PC16. Explain and show how to read and interpret Material Safety Data Sheet (MSDS)	2	2	-	-
PC17. Discuss how to select and install hydrogen compression system	2	-	-	-
PC18. Explain key components/ parameters of compressors including Pressure Valve , indicators, Gas Outlet & Inlets Valves, Tank size and Placement etc	1	2	-	-
PC19. Show how compression system comply and follow all the applicable safety and regulatory standards.	1	3	-	-
NOS Total	**24**	**26**	**-**	**-**

SGJ/N0152: Set up and operate Hydrogen storage system

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Hydrogen Storage	**24**	**26**	**-**	**-**
PC1. Explain the need for hydrogen storage and hydrogen storage system	2	-	-	-
PC2. Explain and illustrate the Challenges associated with Hydrogen in storage, handling and transportation	2	3	-	-
PC3. Discuss how to select and install hydrogen storage system	2	-	-	-
PC4. Discuss the precautions required to store hydrogen	2	-	-	-
PC5. Show how to perform the required safety procedures as per industry standard	-	3	-	-
PC6. Discuss Safety procedures – Do's & Don'ts for hydrogen storage	2	1	-	-
PC7. Discuss and show the safety guidelines to be followed as per applicable standards	2	2	-	-
PC8. Show how storage system comply and follow all the applicable safety and regulatory standards.	-	3	-	-
PC9. Demonstrate how to read and interpret Material Safety Data Sheet (MSDS)	-	3	-	-
PC10. Discuss the architecture of Piping arrangement and Basics of Storage layout requirement	2	2	-	-
PC11. Explain the different methods of H2 storage (single vessel/multi cylinder cascade/portable storage/ tube-trailers etc and how these systems are set up	2	1	-	-
PC12. Explain about type I/II/III/IV cylinders and difference in setting up method.	2	1	-	-
PC13. Outline Use of special tools and tackles utilised for installing and operating hydrogen storage system	2	3	-	-

PC14. Discuss the Depressurization methods of Hydrogen Storage System - Use of Water seal or vent stack system	2	-	-	-
PC15. Explain and outline key safety measures to be followed at hydrogen compression and storage system including performing Periodic / regular leak testing of Hydrogen, Storage Systems using soap solution, carry out Gas leak detection & method of placement, understand the use of Firefighting system, Use of FRC (Flame Resistant Clothing) in Hydrogen area.	2	4	-	-
NOS Total	**24**	**26**	**-**	**-**

SGJ/N0151: Commissioning ofGreen Hydrogen system

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
System Commissioning	**24**	**26**	**-**	**-**
PC1. Describe on the importance and use of checklists for commissioning of each hydrogen system / equipment / machinery / piping as per OEM recommendation.	4	2	-	-
PC2. Explain Green hydrogen system installation, testing and commissioning checklist	3	-	-	-
PC3. Discuss and Show how to perform various activities conforming to the checklists for commissioning of each hydrogen system / equipment / machinery / piping as per OEM recommendation	2	4	-	-
PC4. Discuss and show how various Inputs, outputs and key performance metrics for hydrogen generation are analysed	2	3	-	-
PC5. Show how to follow the checklist for Green hydrogen system installation, testing and commissioning	2	4	-	-
PC6. Discuss pre-commissioning tests/ Downstream considerations including hydrogen purity & pressure test, to detect leakage, Compressor Assembly operational and performance test Drying Plant Hydraulic, Safety test and performing trial run	3	-	-	-
PC7. Show how to arrange all instruments, equipment and facilities as required for inspection and testing at works to carry our trial run, commissioning tests	-	3	-	-
PC8. Explain trial run and pre-commissioning tests and the commissioning of Green Hydrogen Generation Plant in accordance with the applicable norms/ statutory requirement/ regulatory standards.	3	2	-	-
PC9. Discuss and Show how various Inputs, outputs and key performance metrics for hydrogen generation are analysed	3	4	-	-

PC10. Discuss and Show how to perform trial run and pre-commissioning tests and the commissioning of Green Hydrogen Generation Plant in accordance with the applicable norms/ statutory requirement/ regulatory standards.	2	4	-	-
NOS Total	**24**	**26**	**-**	**-**

SGJ/N0802: Maintain Health & Safety at Green Hydrogen generation project site

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Safe work area	**24**	**26**	**-**	**-**
PC1. Explain the requirements for safe work area at hydrogen generation project site	2	2	-	-
PC2. Explain the importance of Occupational health & Safety standards and regulations for Basic considerations for the safety of hydrogen systems	3	-	-	-
PC3. Explain the importance of administering first aid and Demonstrate how to administer first aid	3	-	-	-
PC4. Demonstrate the usage of personal protective equipment for ensuring safety during installation and O&M work	-	3	-	-
PC5. Describe potential causes of emergency such as gas leaks, fire, explosion, bomb threatening, natural calamities etc	2	-1	-	-
PC6. Demonstrate the use of fire extinguishers, fire detection and alarm system	-	2	-	-
PC7. Discuss importance of different detectors and safety tools	3	-	-	-
PC8. Show how to comply with all applicable statutory requirements along with safety regulations in terms of fire protection.	-	3	-	-
PC9. Review the Material Safety Data Sheet and labels of chemicals contained in cylinders in order to be aware of their hazards and precautionary measures	-	3	-	-
PC10. Demonstrate how to follow necessary and adequate safety measures including personal protective equipment and precautions to avoid any accident at hydrogen generation site	-	3	-	-
PC11. Explain need to maintain ideal temperature and humidity level of storage areas used to safely contain gas cylinders	3	-	-	-

PC12. Discuss how to Utilize sensors that can alert the responsible person such as a safety officer when storage rooms are not maintaining the ideal conditions for storing hazardous chemicals	2	-	-	-
PC13. Identify the personal protective equipment used for the specific purpose.	2	2	-	-
PC14. Demonstrate how to follow necessary and adequate safety measures including personal protective equipment and precautions to avoid any accident at hydrogen generation site	-	2	-	-
PC15. Identify the hazards associated with hydrogen generation system	-	2	-	-
PC16. Identify work safety procedures and instructions for working at hydrogen generation plant complying with applicable safety regulations	-	2	-	-
PC17. Discuss Mock testing of fire fighting system	2	-	-	-
PC18. Discuss all applicable statutory requirements along with safety regulations in terms of fire protection.	2	-	-	-
PC19. Show how to Incorporate good housekeeping practices and infection control guidelines.	-	3	-	-
NOS Total	**24**	**26**	**-**	**-**

DGT/VSQ/N0102: EmployabilitySkills (60 Hours)

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Introduction to Employability Skills	1	1	-	-
PC1. identify employability skills required for jobs in various industries	-	-	-	-
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**	**-**	**-**

Annexure: 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:

- Batches assigned to the assessment agencies for conducting the assessment on SDSM/SIP or email
- Assessment agencies send the assessment confirmation to VTP/TC looping SSC
- Assessment agency deploys the ToA certified Assessor for executing the assessment
- SSC monitors the assessment process & records

2. Testing Environment:

- Confirm that the centre is available at the same address as mentioned on SDMS or SIP
- Check the duration of the training.
- Check the Assessment Start and End time to be as 10 a.m. and 5 p.m.
- Check that the allotted time to the candidates to complete Theory & Practical Assessment is correct.
- Check the mode of assessment—Online (TAB/Computer) or Offline (OMR/PP).
- Confirm the number of TABs on the ground are correct to execute the Assessment smoothly.
- Check the availability of the Lab Equipment for the particular Job Role.

3. Assessment Quality Assurance levels / Framework:

- Question papers created by the Subject Matter Experts (SME)
- Question papers created by the SME verified by the other subject Matter Experts
- Questions are mapped with NOS and PC
- Question papers are prepared considering that level 1 to 3 are for the unskilled & semi-skilled individuals, and level 4 and above are for the skilled, supervisor & higher management
- Assessor must be ToA certified & trainer must be ToT Certified
- Assessment agency must follow the assessment guidelines to conduct the assessment

4. Types of evidence or evidence-gathering protocol:
    - Time-stamped & geotagged reporting of the assessor from assessment location
    - Center photographs with signboards and scheme specific branding
    - Biometric or manual attendance sheet (stamped by TP) of the trainees during the training period
    - Time-stamped & geotagged assessment (Theory + Viva + Practical) photographs & videos

5. Method of verification or validation:
    - Surprise visit to the assessment location
    - Random audit of the batch
    - Random audit of any candidate

6. Method for assessment documentation, archiving, and access
    - Hard copies of the documents are stored
    - Soft copies of the documents & photographs of the assessment are uploaded / accessed from Cloud Storage
    - Soft copies of the documents & photographs of the assessment are stored in the Hard Drives

On the Job:

OJT Monitoring Report

- As in Green Jobs Sector, reproducing the evidence for assessment is not feasible due to constraints like cost, confidentiality and controlled environment, every
- apprentice is required to record the evidences performed during the OJT and the same gets authorized by his/her supervisor.
- The evidence recording is done in a structured monitoring report, termed as OJT Monitoring report.
- During the OJT, every trainee is required to fill the OJT monitoring report which is required to be signed by his/her supervisor.
- Towards the end of OJT period these reports are submitted with the HR department of company
- These duly submitted reports are then verified by an Industry nominated assessor for verification of evidence.

Theory, Practical & Viva:

- Scope – Is used to test the knowledge and understanding and skills acquired during the OJT as well as to conform the OJT monitoring report.
- Some personality traits and generic skills (such as – promptness, sharpness, communication skills, depth of knowledge, comprehension, presentation, patience
- etc) can also be tested, which is also required for the QP.

- Tools – The assessment's questions should be aligned with the Qualification Pack, covering the PCs. There will be summative assessment at the end of the OJT.
- Method – Direct questions open and close ended questions, situation-based questions, analytical questions, and decision-making based questions for Viva,
- MCQ for the theory and performing QP related operations for practical. Different questions in theory, practical and viva are included to test relevant PCs from
- the QP
- Analysis – Assessor draws a spectrum of ready answers to be expected from trainee for Viva. This reduces effect of subjectivity of the assessor. Comparative
- quality of trainees within a batch or different institutes can be gauged. The skill is gauged by observing the practical work.

Execution of OJT Assessment:

- HR department hands over the individual OJT monitoring report with Industry nominated assessor and schedules an assessment meeting for each trainee.
- Industry nominated assessor assesses each trainee based on OJT monitoring report, viva on each PC and also takes into account attendance of each trainee towards the end of the OJT period.
- The OJT marks are compiled for each NOS by the Industry nominated assessor and submitted with HR department of company.
- The OJT assessment results are then sent to SCGJ by HR department of company in a sealed envelope for compiling the assessment results in case of offline assessment.

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

Annexure: Career Progression and OM