QUALIFICATION FILE

Solar Enterprise Assistant Manager

☒ 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: 5

Submitted By:

Skill Council for Green Jobs

Chief Executive Officer
CBIP Building, Malcha Marg,
Chanakyapuri, New Delhi – 110021
Contact no. and mail: 9871119101, ceo@sscgj.in

Contents

Section 1: Basic Details

1.	**Qualification Name**	**Solar Enterprise Assistant Manager**	
2.	**Sector/s**	Environmental Science	
3.	**Type of Qualification:** ☐ **New** ☒ **Revised** ☐ **Has Electives/Options** ☐**OEM**	**NQR Code & version of existing/previous qualification:** 2020/ES/MOEF/03957 & version 1.0	**Qualification Name of existing/previous version:** Certificate Course in: Sustain and enhance technical knowledge in Solar Energy Systems
4.	**a. OEM Name** **b. Qualification Name** (Wherever applicable)		
5.	**National Qualification Register (NQR) Code &Version**	**QG-05-ES-01754-2023-V1-SCGJ & version 1**	**6. NCrF/NSQF Level:** 5
7.	**Award (Certificate/Diploma/Advance Diploma/ Any Other**	Certificate	
8.	**Brief Description of the Qualification**	According to the Indian Renewable Energy Development Agency Limited (IREDA), India is endowed with abundant solar energy capable of producing 5,000 trillion kilowatts (kW) of clean energy. Moreover, India gets 300 sunny days a year in most parts of the country and solar insulation of 4-7 kWh per square meter per day. Strengthen domestic manufacturing of various technology components like solar cells, modules, batteries to generate indirect employment opportunities in these allied sectors. This course would help them to support industry players for implementation of projects across the country. To enhance their knowledge in the field of Solar Energy Technologies and its applications. The participants would be able to learn the knowledge on theory and practical session for quality aspect as qualitative and quantitative measurement. Course will cover both Theoretical as well as Practical sessions which help participants to understand the importance of solar energy applications.	
9.	**Eligibility Criteria for Entry for Student/Trainee/Learner/Employee**	**a. Entry Qualification & Relevant Experience:** UG Diploma OR 12 + 2 year diploma in relevant field with 1 year of relevant experience	

<table>
<tr><td></td><td></td><td colspan="2">OR
10 + 3 year diploma in relevant field with 1 year of relevant experience
OR
Previous relevant Qualification of NSQF Level 4 with 3 years of relevant experience

b. Age: 21 yrs</td></tr>
<tr><td>10</td><td>Credits Assigned to this Qualification, Subject to Assessment (as per National Credit Framework (NCrF))</td><td>17</td><td>10. Common Cost Norm Category:</td></tr>
<tr><td>11</td><td>Any Licensing requirements for Undertaking Training on This Qualification (wherever applicable)</td><td colspan="2">NA</td></tr>
<tr><td>12</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 colspan="2">☒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>Total (Hours)</th></tr>
<tr><td>Classroom (offline)</td><td>180</td><td>180</td><td>150</td><td></td><td>510</td></tr>
<tr><td>Online</td><td></td><td></td><td></td><td></td><td></td></tr>
</table>
(Refer Blended Learning Annexure for details)</td></tr>
<tr><td>13</td><td>Aligned to NCO/ISCO Code/s (if no code is available mention the same)</td><td colspan="2">2143.0100 (NCO, 2015) : Solar Energy System Designer
7421.1401/1402 (NCO, 2015): Solar Photo Voltaic System Installation Technician 7421.1403 (NCO, 2015) : PV System Installation Engineer
2433.0501 (NCO, 2015) : Sales Executive – Solar Electronics
3113.0101 (NCO, 2015) : Electrical Engineering, Technician/Maintenance Technician Electrical
3113.1002 (NCO, 2015) : LED Light Repair Technician</td></tr>
</table>

		7419.0500 (NCO, 2015) : Battery Servicing Man 6115(Medicinal and Aromatic Plant Cultivators) 6210.0600(Gatherer, Medicinal Herbs) 6111.0100(Cultivator, General) 6113.0200 (Nurseryman)
14	**Progression path after attaining the qualification** (Please show Professional and Academic progression)	Vertical Progression: Solar PV Site in-Charge/Energy Modeller(Level6)
15	**Other Indian languages in which the Qualification & Model Curriculum are being submitted**	Hindi
16	**Is similar Qualification(s) available on NQR-if yes, justification for this qualification**	**☐ Yes ☒ No**
17	**Is the Job Role Amenable to Persons with Disability**	**☒ Yes ☐ No** **If "Yes", specify applicable type of Disability:** **☐ Deaf ☐ Hard of Hearing ☒ Acid Attack Victims ☐ Dwarfism** Person with disability can be play an entrepreneur role to open a counter sell point for their region as several components engage with it i.e. Solar Panel, Battery, Invertor and accessories which is high demand on counter sell as well if person have proper knowledge in the relevant field.
18	**How Participation of Women will be Encouraged**	Engaging local partners to advertise about training and its benefits to grass root level will help us in women participation. Linkages with industries for jobs in this field will increase women participation.10% of seats can be reserved for women to increase their participation. Selection of the participants will be done as per the eligibility criteria without any gender biases. Linkages with industries for jobs in this field will increase women participation.

19	**Are Greening/ Environment Sustainability Aspects Covered** (Specify the NOS/Module which covers it)	☒ **Yes** ☐ **No**	
20	**Is Qualification Suitable to be Offered in Schools/Colleges**	**Schools** ☒ **Yes** ☐ **No** **Colleges** ☒ **Yes** ☐ **No**	
21	**Name and Contact Details of Submitting / Awarding Body SPOC** (In case of CS or MS, provide details of both Lead AB & Supporting ABs)	**Name:** Dr. Praveen Saxena **Email:** ceo@sscgj.in **Contact No.:** 9871119101 **Website: https://sscgj.in/**	
22	**Final Approval Date by NSQC: 31/01/2024**	**23. Validity Duration:** 3 years	**24. Next Review Date: 31/01/2027**

Section 2: Module Summary

Mandatory NOS/s

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.	Employability	Total	Th.	Pr.	Proj.	Viva	Total	Weightage (%) *(if applicable)*
1.	Introduction to Renewable (solar)energy, climate change, tools used in solar energy, Electromagnetism	SGJ/N4066: Version 1	Core	5	2	**30**	**30**			60	75	25			100	

2.	Identify Components of solar Photovoltaic System	SGJ/N4067: Version 1	Core	5	2	**22.30**	**37.30**			60	70	30			100	
3.	Perform Site Assessment, Design, Sizing & Installation of Solar Home System Installation	SGJ/N4068: Version 1	Core	5	3	**30:00**	**60:00**			90	47	53			100	
4.	Perform Commissioning, Testing and O&M and Environmental Impacts of Solar PV system	SGJ/N4069: Version 1	Core	5	1	**22:30**	**07:30**			30	10	40			50	
5.	Understand Basics of Computers and E-Commerce	SGJ/N4070: Version 1	Core	5	1	**07:30**	**22:30**			30	20	30			50	
6.	Identify Geographic Information System of Solar PV system	SGJ/N4071: Version 1	Core	5	1	**07:30**	**22:30**			30	25	25			50	
7.	Employability Skills (60 hours)	DGT/VSQ/ N0102: Version 1	Core	4	1	60				60	20	30			50	
8.	On the Job Training							150		150						
Duration (in Hours) / Total Marks						180	180	150		**510**	267	233			500	

NOS/s of Qualifications
(In exceptional cases these could be described as components)

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*

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)*	B.Sc. Sciences/M.Sc. Physics/ B.Tech /M.Tech Electronics or equivalent, Minimum of 2 years of experience in relevant field
2.	**Master Trainer's Qualification and experience in the relevant sector (in years)** *(as per NCVET guidelines)*	M.Sc. Physics/ B.Tech/M.Tech Electronics or 3 years' experience
3.	**Tools and Equipment Required for Training**	☒Yes ☐No (*If "Yes", details to be provided in Annexure) Clamp meter, Multi meter, Battery tester, Earthing tester and General tool kit.*
4.	**In Case of Revised Qualification, Details of Any Upskilling Required for Trainer**	Not Applicable

Section 4: Assessment Related

1.	**Assessor's Qualification and experience in relevant sector (in years)** *(as per NCVET guidelines)*	M.Sc. Physics/ B.Tech/M.Tech Electronics or 3 years' experience
2.	**Proctor's Qualification and experience in relevant sector (in years)** *(as per NCVET guidelines)*	M.Sc. Physics/ B.Tech/M.Tech Electronics or 5 years' experience. NCVET approved/ empaneled Assessors, experienced as invigilator

3.	**Lead Assessor's/Proctor's Qualification and experience in relevant sector (in years)** *(as per NCVET guidelines)*	M.Sc. Physics/ B.Tech/M.Tech Electronics or 10 years' experience. NCVET approved/ empaneled Assessors, experienced as invigilator
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):** Yes**,** India has a unique opportunity to create millions of sustainable jobs in the power sector. In all the scenarios, the workforce required in the Indian power sector will increase considerably. This is primarily triggered by the expansion of power generation capacity in order to power economic growth in India. However, moving towards a decarbonised power sector can provide additional benefits. Solar sub-sector creates the highest number of jobs in the

	power sector in India. Many of these jobs will occur during the construction phase, which accounts for 2.95 FTE/MW/Year, while the operations and maintenance phase creates about 0.5 FTE/MW/Year. More jobs will be created in the solar sector because rooftop solar is more labour intensive than any other (renewable) energy technology. Rooftop solar employs 24.72 person per MW installed capacity. Over the long term, with a shift from BAU to the REmap scenario, over 1 million additional jobs can be created through the solar industry by the year 2050, and over 700,000 additional jobs through REmap in comparison with the NDC scenario.
2.	**Latest Market Research Reports or any other source (not older than 2 years) (Yes/No):** Yes • **https://unevoc.unesco.org/pub/solar_energy_demands-discussion_paper1.pdf** • **https://www.ceew.in/sites/default/files/Green-Jobs-Report-Jan27.pdf** • **https://www.cobenefits.info/wp-content/uploads/2019/10/COBENEFITS-Study-India-Employment.pdf**
3.	**Government /Industry initiatives/ requirement (Yes/No):** The pedagogy of the course has been developed with support from Ministry and Academia/ Subject experts/ Scientist etc, it may be further adopted by the Industry players for the on-job training etc.
4.	**Number of Industry validation provided:** 5
5.	**Estimated nos. of persons to be trained and employed:** 30 persons in one batch; 10 batches in a year. Approx. 45% will be employed or start an entrepreneurship journey.
6.	**Evidence of Concurrence/Consultation with Line Ministry/State Departments:** *Concurred by Ministry of Environment, Forest and Climate Change, GoI*

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)*	Solar PV systems designing and installation and commissioning, Solar Plant Operator, Solar Technician, Self-sustainable Entrepreneur
9.	**Supporting Document:** Assessment SOP *(Mandatory)*	Annexure: Assessment Strategy

Annexure: Evidence of Level

Title/Name of qualification/component: Solar Enterprise Assistant Manager			**Level: 5**
NSQF Domain	**Outcomes of the Qualification/Component**	**How the outcomes relate to the NSQF level descriptors**	**NSQF Level**

Title/Name of qualification/component: Solar Enterprise Assistant Manager		Level: 5	
NSQF Domain	**Outcomes of the Qualification/Component**	**How the outcomes relate to the NSQF level descriptors**	**NSQF Level**
Professional Theoretical Knowledge/ Process	Trainees would get the overall understanding and idea of Green Skill development. Solar components are well identified by the Trainees. They can understand the different types of solar devices and assessment of power, customization of solar system and its importance. They learn step-by-step methodology and designing the On-grid, Off-Grid and Hybrid type of connections of a photovoltaic (PV) system. They are able to understand and assess the market needs.	The trainee will able to understand needs of the hour for solar industry. The participants have to complete a design assignment with given site and climatic information, equipment data sheets and economic considerations of the prevailing market. After completion of course, the trainee can independently handle or work as an energy entrepreneur.	5
Professional and Technical Skills/ Expertise/ Professional Knowledge	The course meticulously covers the forms of protection used within a PV systems, the method of determining whether fault current protection is required and the sizing of fault current protection. Similarly, sizing and selection of DC and AC cabling is also explained, with several working examples. The trainee will attain knowledge of book keeping, taxation and systematic approval towards development of energy entrepreneur.	Factual knowledge of PV system and its use for livelihood generation would be understood by the trainee. The trainee can calculate loading for solar arrays in different regions. The course not only provides insights of the solar PV system but also helps in assessing the importance of various parameters/ factors that affect the performance of a system.	5
Employment Readiness & Entrepreneurship Skills & Mind-	The course covers the foundations/ basic understanding of actual project implementation and design principles of Solar PV. This training bridges the gap between theoretical learning and implementation of knowledge with requisite technical expertise for taking on detailed Solar PV plant designing. The course focuses on on-grid, off-Grid and Hybridized systems.	The trainee would obtain advance skill and technical knowledge and expertise on Solar PV plant designing.	5

Title/Name of qualification/component: Solar Enterprise Assistant Manager		Level: 5	
NSQF Domain	**Outcomes of the Qualification/Component**	**How the outcomes relate to the NSQF level descriptors**	**NSQF Level**
set/Professional Skill			
Broad Learning Outcomes/ Core Skill	In terms of core skills acquired, trainees will gain basic knowledge of solar PV system and electrical/ electronic. Computer, GIS, E-commerce and other soft skills knowledge will be an added advantage.	The trainee would obtain the required technical and communication skills to carry out the activities related to documentation of Solar system. Also they will obtain the basic knowledge of computer and other soft skills (like personality development, communication skills to enhance soft skills). The trainee develops the core skill sets required to carry out data collection, analysis as well as statistical validation and interpretation of the datasets. The trainee becomes responsible for his/her own work in the area of Solar PV systems designing and installation and commissioning.	5
Responsibility	The trainees would be able to independently handle the detailed Solar PV plant designing and installation.	The trainee becomes responsible for his/her own work in the area of Solar PV systems designing and installation and commissioning.	5

Annexure: Tools and Equipment (Lab Set-Up)

List of Tools and Equipment
Batch Size: 25

S. No.	Tool / Equipment Name	Specification	Quantity for specified Batch size
1.	Screw Drivers set	Taparia / Equalant	1
2.	Measuring tape	ISI Mark	1
3.	Wrench	10/11 & 12/13 – Taparia / Evaready	2
4.	Pliers	Taparia / ISI Mark	1
5.	Hammers	200 grm / 500 grm	1
6.	Wire Cutters	0.5 mm	1
7.	Chisels	125mm	1
8.	Allen Keys	1-6 inch	1
9.	Hand Drill & drill bit	1-10mm	1
10.	Multi meter (basic model)	DC Voltage 200mV/2/20/200/1000V	1
11.	Neon tester	Line tester	1
12.	Wire stripper	0.5mm	1
13.	Solar Power Plant	1 KW	1
14.	Insulation Resistance Tester 250V/500V/1000V 1 Solar Panel Mounting Hardware Kit Various Sizes 1 Kit Torque Wrench Adjustable, 10-50 Nm 1 Panel Cleaning Kit Soft Brush, Wiper, Cleaning Solution 1 Kit Junction Box Weatherproof, IP65 1 Array Combiner Box With Surge Protection 1 DC Disconnect Switch 25A, 1000V 1 Inverter 1 KW 1 Battery Bank 200 Ah, 12V 1 Charge Controller 10A, MPPT 1 Load Tester 1000W 1 PV Module Analyzer For Testing Solar Panels 1		

	Light Intensity Meter For Measuring Solar Irradiance 1		

Classroom Aids
The aids required to conduct sessions in the classroom are:

1. Tool kit for the practical session
2. SPV models to be used for the session

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.	Green Solutions	Shivam Shukla		229 LIG Barra-4 Kanpur-208027	8953991360	greensolutionknp@gmail.com	
2.	Eastman Auto & Power Ltd	Mr Anil Bhaskar	GM	Corp office: 572, Udyog Vihar, Phase-V, Gurgaun	7701968917	anil.bhasker@eaiworld.com	
3.	Lipok Social Foundation	Joy Daniel	Founder Director	RH 10, Sector 2, Hindustan Awas, Nakshatrawadi, Aurangabad 431002, Maharashtra	9823067272	joydaniel@lipok.org	
4.	Paawan	Rajnish Mishra	Manager –	220-221,	7409888210	Rajnish.mishra@paawanenergy.com	

	Energy India Pvt Ltd		Business Development	Tower-4, Assotech Business Cresterra, Sector-135, Noida Expressway-201304, Uttar Pradesh			
5.	Ms Sunlight Solar	Rohit Kumar	Director	Near Tata Central Hospital, Aakash Telecom, Jamadoba, P.S – Parsia, Dhanbad (Jharkhand) – 828301 Baradev Godowlia, Varanasi, Uttar Pradesh 221001	9507153182	sunlightsolar12@gmail.com	
6.	Shramik Bharti Foundation	Shivam Shukla		394, Vikas Nagar, Lakhanpur, Kanpur-208024	8953991360	Alok.srivastava@shramikbharti.org.in	

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
2023-24	35	45%	Minimum 5% women candidates in one batch	0	0	0
2024-25	45	45%	Minimum 5% women candidates in one batch	0	0	0
2025-26	50	50%	Minimum 5% women candidates in one batch	0	0	0

Data to be provided year-wise for next 3 years

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

Year	Total Candidates				Women				People with Disability			
	Trained	Assessed	Certified	Placed	Trained	Assessed	Certified	Placed	Trained	Assessed	Certified	Placed
2018-19	204	204	204	104	52	52	52	2	0	0	0	0
2019-20	311	311	311	174	59	59	59	1	0	0	0	0
2020-21	168	168	168	65	53	53	53	1	0	0	0	0

2021-22	300	300	300	167	58	0	0	0	0	0	0	0

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

. ***Justification:*** *Estimated training is 1 and estimated employment per training is 25 per financial year as proposed.*

Content availability for previous versions of qualifications:

Participant Handbook

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	Not Applicable	Not Applicable

2	☒Imparting Soft Skills, Life Skills, and Employability Skills /Mentorship to Learners		
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 3: Detailed Assessment Criteria

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

NOS/Module Name	Assessment Criteria for Performance Criteria/Learning Outcomes	Theory	Practical	Project	Viva
SGJ/N4066: Introduction to Renewable (solar)energy,	*Introduction to Renewable and Solar Energy fundamentals*	35	-	-	-

climate change, tools used in solar energy, Electromagnetism	**PC1.** explain basics of renewable energy, Importance of Renewable energy, Types of renewable energy.	5	-	-	-
	PC2. discuss status of Solar energy in India & Solar resource.	5	-	-	-
	PC3. explain difference between renewable and non-renewable energy.	5	-	-	-
	PC4. discuss permits and approvals, line diagram etc.	5	-	-	-
	PC5. discuss about measurements and testing of system.	5	-	-	-
	PC6. discuss about site risk , hazard assessment and safety management.	5	-	-	-
	PC7. explain impact of solar energy in the economy- Green economy.	5	-	-	-
	Solar Energy &Climate Change	**20**	-	-	-
	PC8. discuss differences of Fossil Fuel & Solar	5	-	-	-
	PC9. explain effects of Solar energy with Earth's	5	-	-	-

	PC10. discuss climate Change and Global	5	-	-	-
	PC11. discuss administrative Functions And	5	-	-	-
	Tools	-	**25**	-	-
	PC12. demonstrate about screw drivers, measuring tape, Wrench, Pliers, Hammers, Hacksaw, Cutters, Chisels, Allen Keys, Hand Drill & drill bit, Try Square, Gimlet, vice, Pipe cutter,	-	6	-	-
	PC13. show mallet, Wire stripper, Centre punch, Hand grinder etc.	-	6	-	-
	PC14. demonstrate sessions on tools.	-	7	-	-
	PC15. ensure students can learn about the tools.	-	6	-	-
	Electromagnetism (Electricity & Magnetism)	**20**	-	-	-
	PC16. explain brief Introduction to Electricity & Electrical circuits.	5	-	-	-
	PC17. explain laws of Resistance, Ohms law's, Kirchhoff's law.	5	-	-	-

	PC18. explain about instrument needed for	5	-	-	-
	PC19. discuss magnetism, Magnetic Needle, Electric &Magnetic fields, Law of ampere, Solenoid, Self & Mutual Inductance, Hysteresis loss.	5	-	-	-
NOS Total		**75**	**25**	**-**	**-**

NOS/Module Name	Assessment Criteria for Performance Criteria/Learning Outcomes	Theory	Practical	Project	Viva
SGJ/N4067: Identify Components of solar Photovoltaic System	*Wires &Cables*	**20**	**5**	**-**	**-**
	PC1. discuss about understanding electrical wire.	5	-	-	-
	PC2. discuss about understanding electrical cable.	5	-	-	-

PC3. explain about insulating material, Standard wire gauge, Continuity tester, Soldering.	5	-	-	-
PC4. discuss safety and its importance, PPEs, Safety Signs, Safety Slogans, Safety Rules, Fire Extinguisher	5	-	-	-
PC5. perform practical sessions on wires and cables.	-	5	-	-
Photovoltaic Technology	**30**	**11**	**-**	**-**
PC6. explain types of Solar cells (Crystalline Silicon, Thin film, Organic Photovoltaic cell/3rd generation PV cell).	5	-	-	-
PC7. explain Cell, Module, String, Array.	5	-	-	-
PC8. discuss STC & NOCT conditions.	5	-	-	-
PC9. discuss Solar cell I-V Characteristics	5	-	-	-
PC10. explain factors affect the performance of solar panel.	5	-	-	-
PC11. discuss difference between Solar PV and	5	-	-	-
PC12. demonstration of Solar PV and its components.	-	6	-	-

	PC13. demonstrate solar cell characteristics.	-	5	-	-
	Components of Photovoltaic System	**20**	**14**	**-**	**-**
	PC14. discuss about solar panels.	5	-	-	-
	PC15. explain mechanism of Batteries, Inverter. Charge Controllers.	5	-	-	-
	PC16. explain mechanism of trackers, balance of system.	5	-	-	-
	PC17. discuss monitoring & metering system.	5	-	-	-
	PC18. demonstration of Batteries, Inverters, Charge Controllers etc.	-	7	-	-
	PC19. perform hands on training on batteries, inverters etc.	-	7	-	-
NOS Total		**70**	**30**	**-**	**-**

NOS/Module Name	Assessment Criteria for Performance Criteria/Learning Outcomes	Theory	Practical	Project	Viva
	Types Of PV Systems	**24**	**15**	**-**	**-**

SGJ/N4068:Perform Site Assessment, Design, Sizing & Installation of Solar Home System Installation	**PC1.** discuss about PV Direct System, Off Grid	3	-	-	-
	PC2. explain grid connected systems (with &	3	-	-	-
	PC3. explain hybrid system.	3	-	-	-
	PC4. explain photovoltaic mounting systems.	3	-	-	-
	PC5. explain roof mounted system.	3	-	-	-
	PC6. explain ground mounted system.	3	-	-	-
	PC7. explain building Integrated photovoltaic.	3	-	-	-
	PC8. discuss mounting as a shade structure.	3	-	-	-
	PC9. demonstration of PV system.	-	5	-	-
	PC10. show off-grid and Grid connected.	-	5	-	-
	PC11. demonstration of roof mounted system.	-	5	-	-
	PV System Design, Sizing & Installation Requirements	**26**	**15**	**-**	**-**
	PC12. determine power consumption demands.	4	-	-	-
	PC13. discuss about size of the PV panels.	3	-	-	-
	PC14. explain battery, inverter, charge controller sizing's.	3	-	-	-

	PC15. discuss about sizing system wiring.	4	-	-	-
	PC16. discuss about solar PV system installation requirements.	4	-	-	-
	PC17. discuss about permits & approvals for PV	4	-	-	-
	PC18. discuss various costs involved in solar PV	4	-	-	-
	PC19. perform designing of solar PV system.	-	5	-	-
	PC20. perform PV installation and requirements.	-	5	-	-
	PC21. draw line diagram for installation.	-	5	-	-
	Site Assessment for Solar Home System Installation	-	**20**	-	-
	PC22. perform site assessment at field.	-	2	-	-
	PC23. perform installation of solar module.	-	2	-	-
	PC24. perform installation of charge controller/regulator.	-	3	-	-
	PC25. perform installation of battery.	-	3	-	-
	PC26. perform wiring of solar home system components.	-	3	-	-

	PC27. show lamp, switch & power socket installation procedures.	-	3	-	-
	PC28. show components assembly of solar home systems.	-	4	-	-
NOS Total		**50**	**50**	**-**	**-**

NOS/Module Name	**Assessment Criteria for Performance Criteria/Learning Outcomes**	**Theory**	**Practical**	**Project**	**Viva**
SGJ/N4069: Perform Commissioning, Testing and O&M and Environmental Impacts of Solar PV system	*Commissioning, Testing and O&M of PV Systems*	**14**	**10**	**-**	**-**
	PC1. discuss final installation checkout.	2	-	-	-
	PC2. discuss about visual inspection.	2	-	-	-
	PC3. discuss about system testing &	2	-	-	-
	PC4. explain about testing PV system.	2	-	-	-
	PC5. discuss about operation & maintenance of the system.	2	-	-	-
	PC6. discuss about troubleshooting of PV	2	-	-	-
	PC7. discuss about site risk & hazard assessment.	2	-	-	-

	PC8. perform commissioning and testing of system.	-	3	-	-
	PC9. perform hands on experience.	-	3	-	-
	PC10. perform troubleshooting of PV system.	-	4	-	-
	Environmental Impacts of Solar PV system	**18**	-	-	-
	PC11. discuss about sustainable source of energy.	2	-	-	-
	PC12. explain about stable energy prices.	2	-	-	-
	PC13. discuss about reliable energy system.	2	-	-	-
	PC14. discuss about land use, water use &	3	-	-	-
	PC15. explain life cycle global warming emissions.	3	-	-	-
	PC16. discuss about job and other economic benefits.	3	-	-	-
	PC17. explain hazardous materials & effects of	3	-	-	-
	Recycling of WEEE	**8**	-	-	-
	PC18. explain basics of recycling for solar PV.	2	-	-	-

	PC19. discuss about lack of regulations, recycling of solar cells, global experience, indian manufacturers, future of recycling.	2	-	-	-
	PC20. discuss about recycle technology of solar panels & batteries.	2	-	-	-
	PC21. discuss about waste electrical &	2	-	-	-
NOS Total		**40**	**10**	**-**	**-**

NOS/Module Name	Assessment Criteria for Performance Criteria/Learning Outcomes	Theory	Practical	Project	Viva
SGJ/N4070: Understand Basics of Computers and E-Commerce	*Basics of Computers Understanding E-Commerce*	**20**	**30**	**-**	**-**
	PC1. explain what is computer.	5	-	-	-
	PC2. explain components of computer.	5	-	-	-
	PC3. explain hardware & software.	5	-	-	-
	PC4. explain basics of e-commerce.	5	-	-	-

	PC5. show basics of ms-word.	-	10	-	-
	PC6. show basics of MS-Excel.	-	10	-	-
	PC7. demonstrate about payment gateways.	-	10	-	-
	NOS Total	**20**	**30**	**-**	**-**

NOS/Module Name	**Assessment Criteria for Performance Criteria/Learning Outcomes**	**Theory**	**Practical**	**Project**	**Viva**
SGJ/N4071: Identify Geographic Information System of Solar PV system	*Geographic Information System (GIS)*	**25**	**25**	**-**	**-**
	PC1. explain what is GIS.	15	-	-	-
	PC2. discuss about tools used to store, visualize, analyse, and interpret geographic data.	10	-	-	-
	PC3. ensure practical understanding of	-	25	-	-
NOS Total		**25**	**25**	**-**	**-**

NOS/Module Name	Assessment Criteria for Performance criteria/Outcomes	Theory	Practical	Project	Viva
DGT/VSQ/N0102.Employability Skills (60 Hours)	*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	-	-	-	-
	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/SID or email
   - Assessment agencies send the assessment confirmation to VTP/TC looping SCGJ
   - Assessment agency deploys the ToA certified Assessor for executing the assessment
   - SCGJ monitors the assessment process & records

2. Testing Environment:

   - Confirm that the centre is available at the same address as mentioned on SDMS or SID
   - 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: Annexure: Career Progression and OM

NSQF Level/domain	Solar Photovotaic Rooftop																		
8	MD/Director																		
6.5-7	Branch Manager		Solar PV BD Manager		Solar PV Designer				Solar PV Project Manager – E&C						Solar PV O&M Manager (Roof Top)				
5.5-6		Liaison Officer				Energy Modeller		Procurement Manager	Solar PV Site In-Charge										
4.5-5	Solar Proposal Evaluation Specialist		Market research analyst		Solar PV Site Surveyor	Solar PV Assistant Structural Design Engineer	Solar PV Assistant Electrical Design Engineer	Procurement Executive	Rooftop Solar Grid Engineer	Solar PV Engineer			Solar Photovoltaic Entrepreneur/Solar Enterprise Assistant Manager	Solar PV O&M Supervisor			HSE Engineer		
3.5-4					Solar PV Site Survey Assistant	CAD/Draughtsman (Mechanical)	CAD/Draughtsman (Electrical)		Solar Photovoltaic Technician	Solar PV Installer (Civil)	Solar PV Installer (Electrical)		Solar PV Installer (Surgamitra)	Solar PV Maintenance Technician (Electrical)	Solar PV Maintenance Technician (Civil/Mechanical)	Solar PV Maintenance Technician (Surgamitra)			
2.5-3																			
2					Solar PV Project Helper					Solar PV Project Helper	Solar PV Project Helper	Solar PV Project Helper		Solar PV Project Helper	Solar PV Project Helper	Solar PV Project Helper			
1																			