

Model Curriculum

Solar PV Installer (Suryamitra)

SECTOR: GREEN JOBS
SUB-SECTOR: RENEWABLE ENERGY
OCCUPATION: Solar Panel Installation Technician
REF ID: SGJ/Q0101, V1.0
NSQF LEVEL: 4



Certificate

CURRICULUM COMPLIANCE TO QUALIFICATION PACK – NATIONAL OCCUPATIONAL STANDARDS

is hereby issued by the

SKILL COUNCIL FOR GREEN JOBS

for the

MODEL CURRICULUM

Complying to National Occupational Standards of
Job Role/ Qualification Pack: 'Solar PV Installer(Suryamitra)' QP No. 'SGJ/Qo1o1.NSQF Level 4'

Date of Issuance: **May 27th, 2021**

Valid up to: **May 26th, 2024**

* Valid up to the next review date of the Qualification Pack

Authorised Signatory
(Skill Council for Green Jobs)

TABLE OF CONTENTS

1. Curriculum	01
2. Trainer Prerequisites	09
3. Annexure: Assessment Criteria	10

Solar PV Installer (Suryamitra)

CURRICULUM / SYLLABUS

This program is aimed at training candidates for the job of a “Solar PV Installer (Suryamitra)”, in the “Green Jobs” Sector/Industry and aims at building the following key competencies amongst the learner

Program Name	Solar PV Installer (Suryamitra)		
Qualification Pack Name & Reference ID. ID	SGJ/Q0101, v1.0		
Version No.	1.0	Version Update Date	27 th May 2021
Pre-requisites to Training	10th pass + ITI / Diploma (Electrical/Electronics/ Civil/Mechanical/ Fitter/ Instrumentation/Welder)		
Training Outcomes	<p>After completing this programme, participants will be able to:</p> <ul style="list-style-type: none"> ☐ Carry out the site survey for installation of Solar PV system ☐ Assess the customer’s Solar PV requirement ☐ Procure the Solar PV system components ☐ Identify and Use the Tools & tackles used for Solar PV system installation ☐ Install the Civil/Mechanical and Electrical components of a Solar PV system ☐ Test and Commission Solar PV system ☐ Maintain Solar PV system ☐ Maintain personal Health & Safety at project site 		

This course encompasses 9 out of 9 National Occupational Standards (NOS) of “Solar PV Installer(Suryamitra)” Qualification Pack issued by “Skill Council for Green Jobs”.

Sr. No.	Module	Key Learning Outcomes	Equipment Required
1	<p>Introduction to Solar PV Installer (Suryamitra) Course</p> <p>Theory Duration (hh:mm) 03:00</p> <p>Practical Duration (hh:mm) 03:00</p> <p>Corresponding NOS Code Bridge Module</p>	<ul style="list-style-type: none"> ☐ Demonstrate general discipline during the training program; ☐ Understand the role of Solar PV Installer and job opportunities; ☐ Understand the advantages of doing this course; ☐ Acquire basic skills of communication; along with skills for working effectively with others while respecting gender and disability concerns ☐ Acquire basic reading capabilities to enable reading of signs, notices and/or cautions at site. 	
2	<p>Basics of Solar energy and Electrical concepts.</p> <p>Theory Duration (hh:mm) 06:00</p> <p>Practical Duration (hh:mm) 06:00</p> <p>Corresponding NOS Code SGJ/N0101</p>	<ul style="list-style-type: none"> ☐ Understand Ohm’s Law; ☐ Understand the basics of electricity and electrical concepts; ☐ Perform simple calculations to derive power and energy ☐ Explain and understand DNI, GHI and Diffused Irradiance & Irradiation; ☐ Assess the movement of the sun and its effect on the performance of the plant; 	Pyranometer, Multimeter, Clamp meter,
3	<p>Basics of Solar Photovoltaic systems and its components.</p> <p>Theory Duration (hh:mm) 24:00</p> <p>Practical Duration (hh:mm) 24:00</p> <p>Corresponding NOS Code SGJ/N0101, SGJ/N0102</p>	<ul style="list-style-type: none"> • Understand Terminology used in the Solar Industry; • Identify the different components of a Solar PV system and its basic operation; • Identify and understand the working of different types of Solar PV systems • latest and innovative technologies used in system configurations like “Plug & Play” or “Behind the Meter” energy systems • Understand and acquire know-how of different Types, sizes and specifications of, Modules, Solar Inverters, Charge Controllers, Cables, Conduits, Junction Boxes, Solar Batteries and allied accessories • Read and Interpret the manufacturing data specification sheets of different types, sizes and specifications of solar PV components. 	Pyranometer, Multimeter, Clamp meter, 1 kWp Solar PV system with 2 number of solar batteries

Sr. No.	Module	Key Learning Outcomes	Equipment Required
		<ul style="list-style-type: none"> ☐ Understand and acquire know-how of different Types, sizes and specifications of foundations/ footings; ☐ Select the right footing/foundation as per site location including suitability of roof condition or suitability of soil 	
4	<p>Identification and Use of different tools and tackles used for installation of solar PV system</p> <p>Theory Duration (hh:mm) 05:00</p> <p>Practical Duration (hh:mm) 11:00</p> <p>Corresponding NOS Code SGJ/NQ0103, SGJ/Q0104</p>	<ul style="list-style-type: none"> • Identify and acquire the know-how of the different tools & tackles used for specific purpose in an installation of Solar PV system 	<p>Tool kit, Double ended flat spanner, Double ended ring spanner, Combination pliers, Side cutting pliers, Nose pliers, Hack saw ,frame with blade, Screw driver, Water level Measuring tape, Centre punch, Standard wire gauge, Vanier calliper, Line Dori, Chisel, Drill m/c, Plumb bob, Sprit level, Flat file, Round file, Triangle file, Hand saw, PVC mallet, Ball pin, hammer, Safety helmet, Safety souse, Safety belt, Nose mask, Safety goggles, Ear plug, PVC hand glove, Cotton hand glove, Reflective jacket, Safety Gloves</p>

Sr. No.	Module	Key Learning Outcomes	Equipment Required
5	<p>Site Survey for Installation of Solar PV System and asses the customer's Solar PV Requirement.</p> <p>Theory Duration (hh:mm) 10:00</p> <p>Practical Duration (hh:mm) 10:00</p> <p>Corresponding NOS Code SGJ/N0101, ELE/N5903</p>	<ul style="list-style-type: none"> ☐ Understand how to observe Sun path diagram and shading analysis; ☐ Understand and assess the site conditions for safe installation of Solar PV system; ☐ Identify the load to be connected to the Solar PV system; ☐ Prepare load profile ☐ Engage with customers for any specific requirement and budget constraints while identifying opportunities for deploying innovative energy solution like "Plug and Play" or "Behind the Meter" solution, where typical civil construction work may not be required ☐ Calculate size of the system with basic mathematical tools; 	<p>Tool kit, Measuring tape, wire gauge, Line Dori Water testing instrument (TDS meter),</p>
6	<p>Interpretation of Drawings , Material Handling and storage of components on-site</p> <p>Theory Duration (hh:mm) 09:00</p> <p>Practical Duration (hh:mm) 09:00</p> <p>Corresponding NOS Code SGJ/N0102</p>	<ul style="list-style-type: none"> ☐ Read and Interpret the Single Line Diagram, Layout Diagrams, Civil/Mechanical and Electrical Drawings ☐ Understand the DO's and Don'ts of material handling; ☐ Read and interpret the Bill of Material to verify with the delivery of components on-site. ☐ Prepare Bill of Materials including for portable and innovative solutions like Plug & Play or Behind the Meter system 	<p>1 kW Solar PV system and tool kit</p>

<p>7</p>	<p>Installation and mounting structure and photovoltaic modules, battery stand and inverter stand as per drawings</p> <p>Theory Duration (hh:mm) 09:00</p> <p>Practical Duration (hh:mm) 21:00</p> <p>Corresponding NOS Code SGJ/N0103</p>	<ul style="list-style-type: none"> ☐ Understand and acquire know-how of installing the mounting structure along with structural supports and accessories for safe & weatherproof installation as per site conditions; ☐ Identify Tools & Tackles used for civil/mechanical installation ☐ Identify opportunities for material and energy conservation, along with use of environmentally friendly materials. 	<p>Tool kit, 1kWp Solar PV system, Double ended flat spanner, Double ended ring spanner, Combination pliers, Side cutting pliers, Nose pliers, Hack saw ,frame with blade, Screw driver, Water level Measuring tape, Centre punch, Standard wire gauge, Vanier calliper, Line Dori, Chisel, Drill m/c, Plumb bob, Sprit level, Flat file, Round file, Triangle file, Hand saw, PVC mallet, Ball pin, hammer, Safety helmet,Safety souse, Safety belt, Nose mask, Safety goggles, Ear plug, PVC hand glove, Cotton hand glove, Reflective jacket, Safety Gloves</p>
<p>8</p>	<p>Installation of Electrical components of a Solar PV System.</p> <p>Theory Duration (hh:mm) 12:00</p> <p>Practical Duration (hh:mm) 30:00</p> <p>Corresponding NOS Code SGJ/N0104</p>	<ul style="list-style-type: none"> ☐ Understand and acquire the know-how of installing the electrical components including inverter, batteries, junction boxes, energy meters, cables and conduits other electrical components ☐ Understand the Do's and Don'ts of DC wiring; ☐ Identify Tools & tackles used for cable and conduit installation ☐ Identify and acquire knowledge of different types of Earthing and its installation; ☐ Understand significance and types of earth faults as per standards ☐ Understand the de-mounting of a solar PV power plant (after commissioning) 	<p>Tool kit, 1kWp Solar PV system, Side cutting pilers, Nose pliers, Wire stripper, Electrician knife, Hand crimping tools, Cable cutter , Screw driver, Water level Measuring tape, Centre punch, Standard wire gauge, Vanier calliper, Line Dori, Fuse puller, Safety helmet, Safety shoe, Safety</p>

Sr. No.	Module	Key Learning Outcomes	Equipment Required
9	<p>Test and Commission Solar PV system</p> <p>Theory Duration (hh:mm) 08:00</p> <p>Practical Duration (hh:mm) 16:00</p> <p>Corresponding NOS Code SGJ/N0105</p>	<ul style="list-style-type: none"> Describe and conduct the testing of all the solar components of the Solar PV system including fault finding and analysis including continuity checks, polarity check and other commissioning activities; Understand Regulations & Standards for interconnection; Describe the Commissioning process for the Solar PV System 	<p>Tool kit, 1kWp SolarPV system, Side cutting pilers, Nose pliers, Wire stripper, Electrician knife, Hand crimping tools, Cable cutter ,Screw driver, Water level Measuring tape, Centre punch, Standard wire gauge, Vanier calliper, Line Dori, Fuse puller, Safety helmet, Safety shoe, Safety belt, Nose mask, Safety goggles, Ear plug, PVC hand glove, Cotton hand glove, Reflective jacket, Clamp meter, MULTIMETER, Megger, Earth tester, Earthing Rod, Soldering Iron & Flux, Phase ,Sequence Meter, Safety Gloves, Pyranometer.</p>
10	<p>Maintain Solar Photovoltaic System</p> <p>Theory Duration (hh:mm) 20:00</p> <p>Practical Duration (hh:mm) 40:00</p> <p>Corresponding NOS Code ELE/N6001</p>	<ul style="list-style-type: none"> Carry out maintenance activities required for each component; Prepare and execute Preventive maintenance schedule and reactive maintenance activities; Understand the Typical faults, their causes and resolution for all components; 	<p>Tool kit, 1kWp Solar PV system, Side cutting pilers, Nose pliers, Wire stripper, Electrician knife, Hand crimping tools, Cable cutter , Screw driver, Water level</p>

Sr. No.	Module	Key Learning Outcomes	Equipment Required
11	<p>Maintain Personal Health & Safety at project site</p> <p>Theory Duration (hh:mm) 06:00</p> <p>Practical Duration (hh:mm) 09:00</p> <p>Corresponding NOS Code SGJ/N0106</p>	<ul style="list-style-type: none"> Identify the requirements for safe work area; Administer first aid; Identify the personal protective equipment used for the specific purpose; Identify the hazards associated with photovoltaic installations; Identify work safety procedures and instructions for working at height; Understand Occupational health & Safety standards and regulations for installation of Solar PV system Incorporate good housekeeping practices and infection control guidelines 	<p>Safety helmet, Safety souse, Safety belt, , Ear plug, PVC hand glove, Cotton hand glove, Reflective jacket, Safety Gloves</p>
12	<p>Completion and Handover Documentation</p> <p>Theory Duration (hh:mm) 04:00</p> <p>Practical Duration (hh:mm) 05:00</p> <p>Corresponding NOS Code SGJ/N0107</p>	<ul style="list-style-type: none"> Understand and prepare the Checklist for handover of the plant; Prepare complete and final documentation including commissioning forms and operation procedure; Identify work safety procedures and instructions for handling heavy components Acquire a thorough understanding of Start-up and shutdown procedure of a Solar PV system; 	

Sr. No.	Module	Key Learning Outcomes	Equipment Required
	<p>Total Duration 300.00 hrs</p> <p>Theory Duration 116:00 hrs</p> <p>Practical Duration 184:00 hrs</p>	<p>Unique Equipment Required: Tool kit, Double ended flat spanner, Double ended ring spanner, Combination pliers, Side cutting pliers, Nose pliers, Wire stripper, Electrician knife, Hack saw frame with blade, Hand crimping tools, Cable cutter, Screw driver, Water level, Measuring tape, Centre punch Standard wire gauge ,Vanier calliper, Line Dori, Chisel, Drill m/c , Plumb bob, Sprit level , Flat file, Round file, Triangle file, Hand saw, PVC mallet, Ball pin hammer, Fuse puller, Safety helmet, Safety souse, Safety belt, Nose mask, Safety goggles, Ear plug, PVC hand glove, Cotton hand glove, Reflective jacket, Clamp meter, MULTIMETER, Megger, Earth tester, Water testing instrument (TDS meter), Earthing Rod, Soldering Iron & Flux, Phase Sequence Meter, Safety Gloves , Pyranometer</p>	

Grand Total Course Duration: **300 Hours, 0 Minutes**

(This syllabus/ curriculum has been approved by [Skill Council for Green Jobs](#))

Trainer Prerequisites for Job role: “Solar PV Installer (Suryamitra)” mapped to Qualification Pack: “SGJ/Q0101, v1.0”

Sr. No.	Area	Details
1	Description	To deliver accredited training service, mapping to the curriculum detailed above, in accordance with the Qualification Pack “SGJ/Q0101, Version 1.0”.
2	Personal Attributes	Aptitude for conducting training, and pre/ post work to ensure competent, employable candidates at the end of the training. Strong communication skills, interpersonal skills, ability to work as part of a team; a passion for quality and for developing others; well-organised and focused, eager to learn and keep oneself updated with the latest in the mentioned field.
3	Minimum Educational Qualifications	ITI /Diploma Electrical, Electronics, Civil, Mechanical, Fitter, Instrumentation or B.Tech (Civil/Mechanical /Electrical/ Instrumentation / Electronics / Electrical and Electronics Eng.) or MSc Physics or The education qualification can be relaxed in case of extraordinary relevant field experience.
4a	Domain Certification	Certified for Job Role: “Solar PV Installer (Suryamitra)” mapped to QP: “SGJ/Q0101, Version 1.0”. Minimum accepted score as per SCGJ is 70%.
4b	Platform Certification	Recommended that the Trainer is certified for the Job Role: “Trainer”, mapped to the Qualification Pack: “MEP/Q2601”. Minimum accepted Score as per SCGJ is 80%.
5	Experience	<ol style="list-style-type: none"> 1. Minimum 3 years of relevant industry experience for ITI /Diploma (Electrical, Electronics, Civil, Mechanical, Fitter, Instrumentation) Or <ol style="list-style-type: none"> 2. Minimum 2 years of relevant industry experience for B.Tech (Civil/Mechanical /Electrical/ Instrumentation / Electronics / Electrical and Electronics Eng.) or MSc Physics

CRITERIA FOR ASSESSMENT OF TRAINEES

Please refer to the QP-NOS for Assessment Criteria.