

EXPRESSION OF INTEREST  
FROM IMPLEMENTATION AGENCIES FOR  
IMPARTING TRAINING TO YOUTH ON  
PAN-INDIA BASIS FOR  
“SURYAMITRA SKILL DEVELOPMENT  
PROGRAMME”

## **Section 1: Background**

### **1.1 Introduction**

India has witnessed an exponential growth in renewable energy sector achieving a total installed capacity more than 30,000 MW (excluding large hydro) as on 2015 (Source: MNRE Achievements <http://www.mnre.gov.in/>). The Ministry of New and Renewable Energy (MNRE), Government of India which has been pioneering this activity, has plans to facilitate further growth to achieve the vision of ‘affordable and reliable clean energy’ to every citizen of the country. The target set by Govt. of India is 100GW of Solar Installed capacity by 2022.

The rapid growth in this sector would require an extensive pool of competent manpower (knowledgeable and skilled) to design, install and maintain the Renewable Energy systems. Against this background the MNRE has proactively worked to meet the demand for the future Human Resource (HR) needs in the Renewable energy sector.

National Institute of Solar Energy (NISE) is an Autonomous Institute of Ministry of New and Renewable Energy, Government of India recently created by converting its erstwhile Solar Energy Centre to function as an Apex National Centre for research and technology development and related activities in the areas of Solar Energy Technologies in the Country, located at Gurgaon- Faridabad Road, Gwal Pahari, Gurgaon.

Under the skill development initiatives of the MNRE, NISE is mandated as the nodal agency for implementation of all Solar Energy Skill Development Programs including “Suryamitra Skill Development Program (SSDP)”. NISE is inviting response document to Expression of Interest (EoI) from Implementation Agencies for training of youth on pan-india basis for SSDP

### **1.2 About Suryamitra Skill Development Program (SSDP)**

SSDP aims to develop the skills of youth, considering the opportunities for employment in the growing Solar Energy Power project’s for installation, operation & maintenance in India and abroad. The SSDP is also designed to prepare the candidates to become new entrepreneurs in Solar Energy sector.

Essential Qualification of Suryamitra: The candidate should be 10+2 pass and not below 18 years and with ITI, Electrician, Diploma in Electrical, Mechanical and Electronics branches.

During the selection of trainees, special emphasis to be given to the persons coming from rural background, unemployed youth, women, SC/ST candidates. The candidates would be provided boarding and lodging facilities. At the end of the course, proper assessment shall be made and certificates shall be issued. Persons with higher qualifications like degree in any discipline engineering / science or higher degree are strictly not eligible.

List of Equipment and Curriculum for SSDP is attached in Annexure 1

### 1.3 Schedule

<b>S. No.</b>	<b>Description</b>	<b>Dates/ Deadlines</b>
1.	Issue of Expression of Interest (EOI)	
2.	Last Date for Receiving Queries from prospective Applicants through Fax/ E-mail	
3.	Replies to the Queries	
4.	EOI Due Date/ Deadline for submission of Response Document	
5.	Selection of Empanelled Applicants	
6.	Issue of Empanelment Letter	

NISE reserves the right to modify/change the bid schedule. Any query to this EoI will be responded through mail/fax until the scheduled date and time as per clause 1.3

NISE in its absolute discretion without being under any obligation to do so, could update, amend or cancel the Expression of Interest (EoI)

## Section 2

### 2.1 Scope of work

NISE invites response document to this Expression of Interest for the selection of Implementation Agencies (IA) to implement Suryamitra Programme on PAN India basis

### 2.2 Eligibility Criteria

- (a) The IA will be shortlisted based on the following criteria (in case, an IA does not fulfill the minimum eligibility criteria, the Proposal of such IA shall be rejected):
- (i) The IA must be a registered legal entity in India which must be in operations for 5 years or more as on March 31, 2015
  - (ii) The IA should have an annual turnover of not less than INR 10 Crores in each of the last three financial years ending March 31, 2015
  - (iii) Affiliated Training Partner with National Skill Development Corporation for atleast one year as on March 31, 2015
  - (iv) IA should have physical presence in at least five different states through their own Training Centres for conducting skills training
  - (v) The IA should have trained a minimum of 50,000 youth through Skill Development programmes with a minimum of 10,000 youth being trained in Engineering Sector (Renewable Energy, Fabrication, Electrical, Industrial Electrical, Electronics, Production and Manufacturing Sector Courses under Modular Employable Skills (MES) Guidelines or their equivalent Sector Skill Council (SSC) Courses)
- (b) The following documentary evidence may be submitted as document to meet the eligibility criteria in the format:
- (i) Certificate of Incorporation of the Legal Entity.
  - (ii) Copies of Local Tax Registration, TIN, PAN etc.
  - (iii) Audited Balance Sheet for last three years
  - (iv) NSDC Partnership Certification
  - (v) MoU/Lease Deed/Electricity Bills of at least one training center across each of the States where the IA is present
  - (vi) A statement certified by a Chartered Accountant to have conducted skill development programmes of minimum 50,000 youth in total and minimum 10,000 youth in Engineering Sector (as defined in Section 2.2.(a).(v))

The Technical Criteria shall be submitted in the format mentioned in the Section 3, Part A of the Submission Template.

## 2.3 Technical Criteria

- (a) Technical Criteria will be evaluated based on the key parameters
- (b) Technical Criteria is the next level of qualifications to selection as IA for SSDP
- (c) The Technical Criteria is based on relevant experience and achievements of the IA having conducted similar programmes in skills training across Pan India

The Technical response will be assessed on the 100 Points scale. The same is given in Table 1, Section 2.4 below. The Technical Criteria shall be submitted in the format mentioned in the Section 3, Part B of the Submission Template.

## 2.4 Technical Scoring Criteria & Weightage

Table below indicates the criteria for scoring for each of the activities listed.

**Table 1: Technical Response Scoring Criteria – 100 marks**

S. No.	Evaluation Criteria / Weightage	Maximum marks	Marks to be allotted	Proof Documents required
<b>A. Technical Capability</b>				
<b>I</b>	<b>Past Experience of the Firm – Skill Development Training</b>	<b>20</b>		Certified statement by a Chartered Accountant to have conducted skill development programmes
	Training of 50001 - 100000 candidates		5	
	Training of 100001 - 150000 candidates		10	
	Training of more than 150000 candidates		20	
<b>II</b>	<b>Past Experience of the Firm – Skill Development Training in Engineering Sector (as defined in Section 2.2.(a).(v))</b>	<b>20</b>		Certified statement by a Chartered Accountant to have conducted skill development programmes in Engineering Sector (as defined in Section 2.2.(a).(v))
	Training of 10001 – 15000 candidates		5	
	Training of 15001 - 20000 candidates		10	
	Training of more than 20000 candidates		20	
<b>III</b>	<b>Trainers with relevant qualification and Experience (Qualification &amp; Experience in Engineering Sector (as defined in Section 2.2.(a).(v)))</b>	<b>15</b>		List of Trainer's and their qualification to be certified by Applicant's HR Department
	Upto 30 Trainers		5	
	31-60 Trainers		10	
	More than 60 Trainers		15	
<b>IV</b>	<b>Projects undertaken with Central State Governments/ PSUs in the last 3 years (as of March 31, 2015)</b>	<b>10</b>		Work Orders/ Sanction Orders of the projects undertaken
	3 to 5 Projects		3	
	6 to 10 Projects		5	
	More than 10 Projects		10	

<b>V</b>	<b>Geographical Presence</b>	<b>10</b>		MoU/Lease Deed/Electricity Bills of at least one training center across each of the States where the IA is present
	Training Centers in upto 5 states		3	
	Training Centers in between 6 to 10 states		5	
	Training Centers in more than 10 states		10	
<b>VI</b>	<b>Placement/ Partnership with Reputed Industries</b>	<b>10</b>		Proof of candidate placed in all the mentioned companies
	Partnerships with 10 to 25 employers		3	
	Partnerships with 26 to 50 employers		5	
	Partnerships with more than 50 employers		10	
<b>VII</b>	Training methodology & overall impact in Skill Development initiatives	<b>15</b>	15	Note on approach & methodology & details of Applicant's Impact – Self certified
	<b>TOTAL</b>	<b>100</b>		

## 2.5 General Conditions

### *Instructions to Submission of Response Document*

- (a) The EoI should be submitted in 2 parts in separate envelopes
- Part A: Eligibility Criteria (as per the criteria mentioned in Section 2.2 and in the format mentioned in Section 3, Part A)
- Part B: Technical Criteria (as per the criteria mentioned in Section 2.3 and in the format mentioned in Section 3, Part B)

### *Conditions to Submission*

- (b) The Eligibility Criteria and Technical Criteria documents with its supporting documents should be properly bound.
- (c) The response document shall be sent/submitted to:
- Dr. NB Raju  
Deputy Director General,  
Skill Development Division  
National Institute of Solar Energy,  
Gurgaon Faridabad Road,  
Gwal Pahari Gurgaon-122003
- (d) All response document must be received by NISE at the address specified above not later than 5.00 pm

## **2.6 Selection Process**

- (a) Eligibility Criteria (Envelope – Part A) of each response document will be evaluated
- (b) The response document which do not meet Eligibility Criteria, will be rejected
- (c) The response document which do meet Eligibility Criteria, would be further evaluated for Technical Criteria (Envelope – Part B)
- (d) The IA who score more than 70% in the Technical Criteria would be empanelled for a period of 5 years to implement SSDP
- (e) NISE would issue a Letter of Empanelment to the the successful IA
- (f) Thereafter, each Empanelled IA would submit a Detailed Project Report (DPR) for training under SSDP. NISE along with MNRE would review the proposals and then sanction the project

## **2.7 SSDP Financials and Payment terms:**

The funding and payment terms for SSDP will be as per the “Common norms for Skill Development Schemes”

### Section 3: SUBMISSION TEMPLATE

#### Part A- Eligibility Criteria

#### A. ELIGIBILITY CONDITIONS

<b>A.1</b>	<b>Title of the Project</b>																							
<b>A.2</b>	<b>Total duration of the project</b>																							
<b>A.3</b>	<b>Name of Organisation</b>																							
<b>A.4</b>	<b>Address of the registered office and contact details of the Organisation</b>	<b>Address:</b> <b>Phone:</b> <b>Email:</b>																						
<b>A.5</b>	<b>Legal status of the Firm/ Organization</b>	<i>(Attach proof of Certificate of Incorporation from the competent Authority)</i> <i>(Attach Copies of Local Tax Registration, TIN, PAN etc.)</i>																						
<b>A.6</b>	<b>Annual Turnover for Last Three Years</b>	<table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th style="width: 10%;">S.No.</th> <th style="width: 20%;">FY Year</th> <th style="width: 20%;">Annual Turnover (Rs. in Cr)</th> <th style="width: 20%;">Net Worth (Rs. in Cr )</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>2012-2013</td> <td></td> <td></td> </tr> <tr> <td>2</td> <td>2013-2014</td> <td></td> <td></td> </tr> <tr> <td>3</td> <td>2014-2015</td> <td></td> <td></td> </tr> <tr> <td></td> <td><b>Total</b></td> <td></td> <td></td> </tr> </tbody> </table> <i>Attach Audited Balance Sheet for last three years</i>			S.No.	FY Year	Annual Turnover (Rs. in Cr)	Net Worth (Rs. in Cr )	1	2012-2013			2	2013-2014			3	2014-2015				<b>Total</b>		
S.No.	FY Year	Annual Turnover (Rs. in Cr)	Net Worth (Rs. in Cr )																					
1	2012-2013																							
2	2013-2014																							
3	2014-2015																							
	<b>Total</b>																							
<b>A.7</b>	<b>NSDC Affiliated Partner</b>	<i>Yes/No</i> <i>(If yes, attach proof of NSDC Partnership)</i>																						
<b>A.8</b>	<b>Details of Training Centers</b>	<table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th style="width: 30%;">Name of the Training Centers</th> <th style="width: 15%;">Location</th> <th style="width: 20%;">Address</th> <th style="width: 20%;">Trades offered (if institute)</th> </tr> </thead> <tbody> <tr> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table> <i>Attach proof of the Training Centers – MOUs, Lease Agreements, Electricity Bills or other such documents</i>			Name of the Training Centers	Location	Address	Trades offered (if institute)																
Name of the Training Centers	Location	Address	Trades offered (if institute)																					



<b>A.9</b>	<b>Total Candidates trained since incorporation</b>	<b>S.No.</b>	<b>FY Year</b>	<b>Candidates Trained - Overall</b>	<b>Candidates Trained - Engineering Sector</b>
		1	2015-2016		
		2	2014-2015		
		3	2013-2014		
		..	.....		
		..	.....		
			<b>Total</b>		
		<i>(Attach statement certified by a Chartered Accountant to have conducted skill development programmes of minimum 50,000 youth in total and minimum 10,000 youth in Engineering Sector (as defined in Section 2.2.(a).(v) )</i>			

**PART – B**

**B. TECHNICAL CRITERIA**

**B.1 Past experience of the firm – Skill Development Training**

<b>S.No.</b>	<b>FY Year</b>	<b>Candidates Trained</b>	<b>Trades for Training</b>
1	2015-2016		
2	2014-2015		
3	2013-2014		
..	.....		
..	.....		
	<b>Total</b>		

*Attach statement certified by a Chartered Accountant to have conducted skill development programmes*

**B.2 Past experience of the firm – Skill Development Training in Engineering Sector (as defined in Section 2.2.(a).(v))**

<b>S.No.</b>	<b>FY Year</b>	<b>Candidates Trained</b>	<b>Trades for Training</b>
1	2015-2016		
2	2014-2015		
3	2013-2014		
..	.....		
..	.....		
	<b>Total</b>		

*Attach statement certified by a Chartered Accountant to have conducted skill development programmes in Engineering Sector (Renewable Energy, Fabrication, Electrical, Industrial Electrical, Production and Manufacturing Sector Courses under Modular Employable Skills (MES) Guidelines or their equivalent Sector Skill Councils (SSC) Courses)*

**B.3 Trainers with relevant qualification and Experience (Qualification & Experience in Engineering Sector (as defined in Section 2.2.(a).(v)))**

Name of Trainer	Areas of Expertise / Trade Name	Education/ Degree / Institution	Total Experience	No. of years of relevant experience in Industry	No. of years of relevant experience in Training

*Attach certified statement by Applicant's HR Department for List of Trainer's and their qualification*

**B.4 Projects undertaken with Central State Governments/ PSU in the last 3 years (as of March 31, 2015)**

S. No.	Year	Name of the project	Source of Fund	Total Cost	Trades for training	Number of Trainees trained

*Attach Work Orders/ Sanction Orders of the projects undertaken*

**B.5 Geographical Presence Detail of training centers**

S.No.	State	District	Name	Address
..	.....	.....	.....	.....
..	.....	.....	.....	.....
..	.....	.....	.....	.....
..	.....	.....	.....	.....

*Attach MOU / Lease Agreement / Electricity Bills of each mentioned training center*

**B.6 Placement/Partnership with reputed Industries**

List the name of organizations where placement linkages is established

Name of Organization	Job Profile	Expected salary range

*Attach placement letter of each organization*

**B7. Note on following:**

Training methodology	300 words
Organisation's overall impact in Skills development initiative	150 Words

## Annexure 1

### GENERAL INFORMATION FOR THE MODULE-5

<b>MODULE-5</b>		
<b>1.</b>	<b>Name of the Module</b>	: Solar PV Technician
<b>2.</b>	<b>Sector</b>	: Renewable Energy
<b>3.</b>	<b>Code</b>	: RNE 805
<b>4.</b>	<b>Entry Qualification</b>	: 10th + ITI in Electrician, Electronics Mechanic,
<b>5.</b>		: Fitter, Turner, Machinist, sheet metal or welder.
<b>6.</b>	<b>Age</b>	: 18 Years and above
<b>7.</b>	<b>Terminal Competency</b>	: After completion of Course Trainees may be able to:
		d. Know the basics of Electricity & solar Electricity
		e. Operate Solar System & Maintain them
		f. Work for execution project
		g. Plan & Install Solar PV Electrical System
		h. Testing and Commissioning of Solar plant
		i. Check all equipment and part with safety
<b>8.</b>	<b>Duration</b>	: 600 hrs
<b>9.</b>	<b>Contents:</b>	
Sr. No.	Underpinning Knowledge (Theory)	Practical Competencies
1.	a. Electrical Safety Electrical safety Rules, Simple First Aid , General safety of tools and equipment PPEs , Fire extinguishers, Type of fire extinguishers b. Electricity Basics c. Introduction to Conventional & Nonconventional source of energy	Introduction of Institute, Display Room Visit, solar training yard visit, Demonstration of energy sources Tools Introduction & type of tools:- 1. Safety tools 2. Marking tools 3. Measuring tools 4. Testing tools 5. Working tools
2.	a. Fundamental of Earthling system b. PV module, Fundamental types of modules and its applications, PV components and Configuration etc. c. System components & inspection d. Site selection , suitability & Planning e. Basic understanding of protection system such as fuse, circuit breaker, relay etc. f. Basic understanding of CT, PT, LA, Switchgear, isolator, ABT meter etc.	Study of Solar photovoltaic cell & solar photovoltaic module, type and size 1 Solar Photovoltaic system 2 Types of solar photovoltaic systems 3 Grid connected Solar PV system, 4 Grid connected with battery back-up solar PV system 5 Off Grid connected Solar PV system 6 Standalone Solar PV
3.	a. Handling and Storage of DC components	Safe handling practices

4.	<p>Reading of drawing and Specifications for the followings</p> <ol style="list-style-type: none"> <li>Civil Foundation or Ramming</li> <li>Structure Erection and Module Mounting</li> <li>Cabling from Module to Inverter Room</li> <li>Inverter and Transformer Installation and Connection</li> <li>Reading of Single Line Diagram (SLD)</li> </ol>	<p>Structure member, cable, cable laying, Types of cable laying-:</p> <ol style="list-style-type: none"> <li>Open area cable laying</li> <li>Underground cable laying <ol style="list-style-type: none"> <li>Direct laying</li> <li>Laying in pipe</li> <li>Solid method</li> </ol> </li> </ol> <p>Installation of inverter, LT panel Transformer, types of Transformer</p> <ol style="list-style-type: none"> <li>Power Transformer</li> <li>Distribution Transformer</li> <li>Auto Transformer</li> <li>Instrumentation transformer</li> </ol> <p>PV module Series &amp; parallel connection &amp; testing</p>
5.	<ol style="list-style-type: none"> <li>Basic knowledge about Tools &amp; Tackles required</li> <li>for PV plant installation</li> <li>Performance analysis and troubleshooting monitoring of generation per string incoming &amp; outgoing power at junction box &amp; Inverter level.</li> <li>Requirement &amp; Uses of Tools &amp; Tackles. Basic knowledge of Ammeter Voltmeter, clamp meter, tong tester, Irradiance sensor, temperature sensors.</li> </ol>	<p>Use of tools and tackles and safe application practices</p> <ol style="list-style-type: none"> <li>Voltmeter</li> <li>Amp meter</li> <li>MultiMate</li> <li>Tong tester (AC/DC side testing)</li> </ol>
6.	<p>Preparation of work statement &amp; documents for the followings:</p> <ol style="list-style-type: none"> <li>Foundation- P&amp;M, Tools &amp; Tackles</li> <li>Structure Erection- P&amp;M, Tools &amp; Tackles</li> <li>Module Mounting- Module Sorting, Tools &amp; Tackles</li> <li>Tackles</li> <li>Cable Trenching &amp; Conduit Laying- P&amp;M, Tools &amp; Tackles, Pre</li> <li>Cable Laying &amp; Termination- Tools &amp; Tackles, Pre</li> <li>Requisite</li> <li>Cable tray &amp; cable laying</li> <li>SCADA &amp; Control System</li> <li>End termination of power cable (LT/ HT)</li> <li>Junction box Installation- Basic knowledge</li> <li>Inverter Erection- Tools &amp; Tackles</li> <li>Battery installation&amp; maintenance</li> <li>Installation of AC Equipment</li> </ol>	<p>Dismantle of Module mounting structure and fixing of the same. Proper alignment and tightening. Fixing of module and its connection. Installation of balance equipment and End termination Power cable. Cable Gland- Types of Cable Gland</p> <ol style="list-style-type: none"> <li>Single compression Cable Gland</li> <li>Double compression Cable Gland</li> <li>Installation of Junction String testing DC Side box</li> </ol>
7.	<p>Inspection, Testing &amp; Commissioning Purpose for Inspection &amp; testing Tools / Instruments Required Procedure and Work Method</p>	<p>Installation of electrical substation Pole Erection, Types of pole Grid Fundamental AC &amp; DC Working AC Side Testing DC Side Testing</p>

		Cable tray , types of cable tray & Cable tray Erection Battery, types of battery, Installation of battery Installation of HT & LT Control panels,
8.	Study of work method & document for the followings a. String Testing- Pre-checks b. Short Circuit Test- Work Method c. Inverter Testing- Work Method d. Check list preparation e. Pre -requirement of installation of sub-station equipment f. Basics and erection of transformers, pole erection and stringing	Fundamental of earthing system, types of earthing, Installation of earthing & earthing testing
9.	Quality: Introduction, quality Management systems Requirement	Site selection, suitability & planning, Fundament of site survey direction shadow effect.
10.	Operation & Maintenance a. Introduction and Over view of PV System b. Equipment's under AC Side & DC Side and regular maintenance c. General Safety Guidelines for O&M d. Soft & Entrepreneurship skills	Solar PV module cleaning & testing Inverter testing, Battery testing, Cell voltage testing, HT&LT Panel testing, earthing testing Cable testing, Transformer condition monitoring.

### **Infrastructure**

1. A Class room with basic teaching aids- white board, table 6'x3' and sitting arrangement.
2. A shadow free ground flat area, practical area 1200 sqmtr, workshop 360 sqmtr
3. Different type of PV facility for training like Fixed, Seasonal Tilt, Horizontal axis Tracker & Dual axis Tracker
4. Various type of Module like Thin Film, Crystalline and Bifacial. Total 10 kW.
5. LCD Projector& Screen.

### **List of Tools& Equipment for a batch of 20 trainees:**

<b>Sr. No.</b>	<b>Name of Tools &amp; Instruments</b>	<b>Quantity (Nos.)</b>
1.	Tool kit	As per requirements
2.	Double ended flat spanner	2 set
3.	Double ended ring spanner	2 set
4.	Combination pliers	4
5.	Side cutting pliers	4
6.	Nose pliers	4
7.	Wire stripper	4
8.	Electrician knife	10
9.	Hack saw frame with blade	4

10.	Hand crimping tools	2
11.	Cable cutter	1
12.	Screw driver	4
13.	Water level	5
14.	Measuring tape	1
15.	Centre punch	1
16.	Standard wire gauge	1
17.	Vanier caliper	1
18.	Line dori	2
19.	Chisel	1
20.	Drill m/c	2
21.	Plumb bob	2
22.	Sprit level	2
23.	Flat file	2
24.	Round file	2
25.	Triangle file	2
26.	Hand saw	2
27.	PVC mallet	2
28.	Ball pin hammer	4
29.	Fuse puller	1
30.	Safety helmet	As per requirement
31.	Safety souse	4
32.	Safety belt	As per requirement
33.	Nose mask	5
34.	Safety goggles	As per requirement
35.	Ear plug	2
36.	PVC hand glove	10
37.	Cotton hand glove	10
38.	Reflective jacket	5
39.	Tong tester AC/DC	2
40.	MULTIMETER	2
41.	Megger	2
42.	Earth tester	2
43.	Water testing instrument (TDS meter)	1
44.	Earthing Rod	1
45.	Soldering Iron & Flux	5
46.	Phase Sequence Meter	2

## Demo Equipment

Sr. No.	Name of Tool & Instrument
1.	Tool kit
2.	Double ended ring spanner
3.	Combination pliers
4.	Side cutting pliers
5.	Nose pliers
6.	Wire stripper
7.	Electrician knife
8.	Hack saw frame with blade
9.	Hand crimping tools
10.	Cable cutter
11.	Screw driver
12.	Water level
13.	Measuring tape
14.	Centre punch
15.	Standard wire gauge
16.	Vanier calipash
17.	Line dori
18.	Chisel
19.	Drill m/c
20.	Plumb bob
21.	Sprit level
22.	Flat file
23.	Round file
24.	Triangle file
25.	Hand saw
26.	Pvc mallet
27.	Ball pin hammer
28.	Fuse puller
29.	Safety helmet
30.	Safety souse
31.	Safety belt
32.	Nose mask
33.	Safety goggles
34.	Ear plug
35.	PVC hand glove
36.	Cotton hand glove
37.	Reflective jacket
38.	Tong tester AC/DC
39.	MULTIMETER
40.	Megger
41.	Erath tester
42.	End termination of power cable
43.	Cable tray Erection
44.	Structure with module mounting

## Safety & Protective Equipment

<b>Sr. No.</b>	<b>Name of Tools &amp; instruments</b>	<b>Quantity (Nos.)</b>
1.	Safety helmet	As per requirement
2.	Safety souse	As per requirement
3.	Safety belt	As per requirement
4.	Nose mask	As per requirement
5.	Safety goggles	As per requirement
6.	Ear plug	As per requirement
7.	PVC hand glove	As per requirement
8.	Cotton hand glove	As per requirement
9.	Reflective jacket	As per requirement
10.	First aid kit	As per requirement
11.	Gum boots	As per requirement



## Course Module

### Solar PV Technician

Sr. No.	Date		Theory (No. of Days)	Course Module	Module Number	Practical (No. of Days)	Period Hours	
	From	To					Theory	Period Hours
1.			2	Electrical Safety Electrical safety Rules, Simple First Aid , General safety of tools and equipment PPEs, Fire extinguishers, Type of fire extinguishers	S-1	2	1	7
2.			3	Electricity Basics	S-2	3	1	7
3.			2	Fundamental of earthing system	S-3	2	1	7
4.			5	PV module Fundamentals types of modules and its applications, PV components and configuration etc.	S-4	5	1	7
5.			2	Introduction to Solar Photovoltaic , Basic Principle of Photovoltaic Tech.	S-5	2	1	7
6.			3	PV System Sizing series & parallel Fundamental, temperature coefficients of current, voltage and power fundamental	S-6	3	1	7
7.			3	Performance analysis and troubleshooting monitoring of generation per string incoming & outgoing power at junction box & Inverter level.	S-7	3	1	7
8.			3	Requirement & Uses of Tools & Tackles. Basic knowledge of	S-8	3	1	7

				Ammeter Voltmeter, clamp onmeter tong tester Irradiance sensor temperature sensors				
9.		2		Cable tray & cable laying	S-9	2	1	7
10.		2		SCADA & Control System	S-10	2	1	7
11.		5		End termination of power cable (LT/ HT)	S-11	5	1	7
12.		5		Commissioning & testing	S-12	5	1	7
13.		4		Structure erection	S-13	4	1	7
14.		3		Battery installation& maintenance	S-14	3	1	7
15.		2		Check list preparation	S-15	2	1	7
16.		2		Pre -requirement of installation of sub-station equipment	S-16	2	1	7
17.		5		Basics and erection of transformers, pole erection and stringing	S-17	5	1	7
18.		5		Foundation- reinforcement& Shutting	S-18	5	1	7
19.		5		Operation & Maintenance	S-19	5	1	7
20.		12		Soft & Entrepreneurship Skills	S-20	12	1	7