Government of Pakistan

National Vocational and Technical Training Commission

Prime Minister's Hunarmand Pakistan Program

"Skills for All"

Course Contents / Lesson Plan
Course Title: Building Electrician and Solar PV Technician

Duration: 06-Months

Revised Edition

Trainer Name	
Course Title	**Building Electrician and Solar PV Technician**
Objectives and Expectations	**Employable skills and hands-on practice for Building Electrician and Solar PV Technician** The construction industry is one of the leading businesses in Pakistan as well as in Middle East and other part of the world. Building Electricians and solar PV technician play a vital role in the installation and maintenance of electrical appliances and Solar Electric Power Plant. The increased use of solar energy has further added to the demand of building electricians and solar PV technician having the skills to install and maintain wiring and solar photovoltaic systems, thus, meeting the ever-growing demand of industry. This course has been design and developed to achieve its objectives of providing appropriate skills. The aim of this program is to produce employable Building Electrician and solar Technician who could provide intermediate installation and maintenance services of electrical appliance, including off/On grid solar photovoltaic (PV) system installation. In addition, this program aims to prepare unemployed youth to find employment in the construction industries or to enable them in becoming successful as entrepreneur. **Main Expectations:** In short, the course under reference should be delivered by professional instructors in such a robust hands-on manner that the trainees are comfortably able to employ their skills for earning money (through wage/self-employment) at its conclusion. This course thus clearly goes beyond the domain of the traditional training practices in vogue and underscores an expectation that a market-centric approach will be adopted as the main driving force while delivering it. The instructors should therefore be experienced enough to be able to identify the training needs for the possible market roles available out there. Moreover, they should also know the strengths and weaknesses of each trainee to prepare them for such market roles during/after the training. **i.** Specially designed practical tasks to be performed by the trainees have been included in the Annexure-I to this document. The record of all tasks performed individually or in groups must be preserved by the management of the training Institute clearly labeling name, trade, session, etc so that these are ready to be physically inspected/verified through monitoring visits from time to time. The weekly distribution of tasks has also been indicated in the weekly lesson plan given in this document. **ii.** To materialize the main expectations, a special module on **Job Search & Entrepreneurial Skills** has been included in the latter part of this course (5th & 6th month) through which, the trainees will be made aware of the Job search techniques in the local as well as international job markets (Gulf countries). Awareness around the visa process and immigration laws of the most favored labor destination countries also form a part of this module. Moreover, the trainees would also be encouraged to venture into self-employment and exposed to the main

requirements in this regard. It is also expected that a sense of civic duties/roles and responsibilities will also be inculcated in the trainees to make them responsible citizens of the country.

iii. A module on **Work Place Ethics** has also been included to highlight the importance of good and positive behavior in the workplace in the line with the best practices elsewhere in the world. An outline of such qualities has been given in the Appendix to this document. Its importance should be conveyed in a format that is attractive and interesting for the trainees such as through PPT slides +short video documentaries. Needless to say that if the training provider puts his heart and soul into these otherwise non-technical components, the image of the Pakistani workforce would undergo a positive transformation in the local as well as international job markets.

To maintain interest and motivation of the trainees throughout the course, modern techniques such as:

- Motivational Lectures
- Success Stories
- Case Studies

These techniques would be employed as an additional training tool wherever possible (these are explained in the subsequent section on Training Methodology).

Lastly, evaluation of the competencies acquired by the trainees will be done objectively at various stages of the training and a proper record of the same will be maintained. Suffice to say that for such evaluations, practical tasks would be designed by the training providers to gauge the problem-solving abilities of the trainees.

(i) Motivational Lectures

The proposed methodology for the training under reference employs motivation as a tool. Hence besides the purely technical content, a trainer is required to include elements of motivation in his/her lecture. To inspire the trainees to utilize the training opportunity to the full and strive towards professional excellence. Motivational lectures may also include general topics such as the importance of moral values and civic role & responsibilities as a Pakistani. A motivational lecture should be delivered with enough zeal to produce a deep impact on the trainees. It may comprise of the following:

- Clear Purpose to convey the message to trainees effectively.
- Personal Story to quote as an example to follow.
- Trainees Fit so that the situation is actionable by trainees and not represent a just idealism.
- Ending Points to persuade the trainees on changing themselves.

A good motivational lecture should help drive creativity, curiosity, and spark the desire needed for trainees to want to learn more.

The impact of a successful motivational strategy is amongst others commonly visible in increased class participation ratios. It increases the trainees' willingness to be engaged on the practical tasks for a longer time without boredom and loss of interest because they can see in their mind's eye where their hard work would take them in short (1-3 years); medium (3 -10 years) and long term (more than 10 years).

As this tool is expected that the training providers would make arrangements

for regular well planned motivational lectures as part of a coordinated strategy interspersed throughout the training period as suggested in the weekly lesson plans in this document.
Course-related motivational lectures online link is available in **Annexure-II**.

(ii) Success Stories

Another effective way of motivating the trainees is using Success Stories. Its inclusion in the weekly lesson plan at regular intervals has been recommended till the end of the training.
A success story may be disseminated orally, through a presentation, or using a video/documentary of someone that has risen to fortune, acclaim, or brilliant achievement. A success story shows how a person achieved his goal through hard work, dedication, and devotion. An inspiring success story contains compelling and significant facts articulated clearly and easily comprehendible words. Moreover, it is helpful if it is assumed that the reader/listener knows nothing of what is being revealed. The optimum impact is created when the story is revealed in the form of:-

- Directly in person (At least 2-3 cases must be arranged by the training institute)
- Through an audio/ videotaped message (2-3 high-quality videos must be arranged by the training institute)

It is expected that the training provider would collect relevant high-quality success stories for inclusion in the training as suggested in the weekly lesson plan given in this document.
Suggestive structure and sequence of a sample success story and its various shapes can be seen in **Annexure III**.

(iii) Case Studies

Where a situation allows, case studies can also be presented to the trainees to widen their understanding of the real-life specific problem/situation and to explore the solutions.
In simple terms, the case study method of teaching uses a real-life case example/a typical case to demonstrate a phenomenon in action and explain theoretical as well as practical aspects of the knowledge related to the same. It is an effective way to help the trainees comprehend in depth both the theoretical and practical aspects of the complex phenomenon in depth with ease. Case teaching can also stimulate the trainees to participate in discussions and thereby boost their confidence. It also makes the classroom atmosphere interesting thus maintaining the trainee interest in training till the end of the course.
Depending on suitability to the trade, the weekly lesson plan in this document may suggest case studies be presented to the trainees. The trainer may adopt a PowerPoint presentation or video format for such case studies whichever is deemed suitable but only those cases must be selected that are relevant and of a learning value.
The Trainees should be required and supervised to carefully analyze the cases.
For this purpose, they must be encouraged to inquire and collect specific information/data, actively participate in the discussions, and intended solutions to the problem/situation.
Case studies can be implemented in the following ways: -

	i. A good quality trade-specific documentary (At least 2-3 documentaries must be arranged by the training institute) ii. Health &Safety case studies (2 cases regarding safety and industrial accidents must be arranged by the training institute) iii. Field visits (At least one visit to a trade-specific major industry/ site must be arranged by the training institute)
Entry-level of trainees	Matric (Science)
Learning Outcomes of the course	By the end of this course, students will be able to: • Develop professionalism associated with the building electrician cum solar technician trade. • Maintain Electrical safeties. • Maintain Documentation (work permit and daily complains records). • Maintain Tools & Equipment. • Interpret Drawings and Layout Electrical Wiring and PV solar system. • Install domestic Wiring and different electrical circuit an according to the demand. • Install Solar Electric Power Plant (Off/On grid PV Solar system). • Students will perform Installations, Assembling and troubleshooting of Electrical system. • Install Electrical Appliances / Items / Solar Panels. • Student will be able to distribute Electrical Supply according to load demand. • Segregate the Electrical load according to newly installed Solar Electric power plant. • Preventive and Corrective Maintenance of wiring and solar electric power plant. • Perform Quality Checks. • Understanding will be developed for new wiring and testing techniques with practical demonstration. • Valuable understanding of use of tool and troubleshooting technique. • Demonstrate the ability to analyze fault. • Demonstrate the ability to communicate effectively both orally and in writing. • Demonstrate an ability to work effectively with others. • Students will understand how employer characteristics and decision-making at various levels enhance the success of an Electrical small enterprise. • Understanding the use of installation, testing and troubleshooting techniques in wiring system as well as solar system.
Course Execution Plan	The total duration of the course: **06 months (26 Weeks)** Class hours: **4 hours per day** Theory: **20%** Practical: **80%** Weekly hours: **20 hours per week** Total contact hours: **520 hours**

Companies offering jobs in the respective trade	1. Heavy mechanical complex texila 2. Aeronautical complex karma 3. Pakistan Atomic energy commission 4. Ministry of water and power development authority 5. Agriculture Department Punjab 6. Fauji Foundation and fauji fertilizer company 7. All engineering and services department 8. All small and large enterprises.
Job Opportunities	Electricians design, install, and repair electrical power systems, including communications, lighting, and control networks in homes, businesses, factories, and public spaces. Solar technicians assemble, install, and maintain solar panel systems that provide solar power on rooftops or other structures. They take measurements to install each solar panel, cut panels to fit, perform tests, troubleshoot, and fix issues. • Trainee will be able to work as building Electrician and solar PV Technician in foreign country. • Trainee will be able to work as an Electrician in Govt and construction industry within e Pakistan. • Work as building electrician in an electrical outfit/company/organization. • Be self employed by having his own electrical wiring workshop. • Be self employed by having his own solar electric power plant Installation Company. • You get to be your own boss. • Interesting work and optimal work environment. • It's a well-respected profession.
No of Students	25
Learning Place	Classroom / Lab
Instructional Resources	Working of PV Solar Power Plant What is Solar Tracking System Block diagram of solar power plant Maximum power point tracking Buck boost converter. https://www.youtube.com/watch?v=0oK_VQnPDuY Type of solar electric power plant 1-ON grid solar electric power plant 2-Off-Grid solar electric power plant 3-hybrid solar electric power plant https://www.youtube.com/watch?v=6LqPPr6eI_4 Definition of Electrician Career of Electrician. https://www.youtube.com/watch?v=VINs_g7oC_I **Reference book** DAE-Electrical-146 (electrical wiring) DAE-Electrical-252(estimation planning) DAE-Electrical-352(the repairing maintenance of electrical appliances)

MODULES

Scheduled Week	Module Title	Learning Units	Remarks
Week 1	**Orientation/Course Introduction** **Health and Safety**	**Motivational Lecture** (For further detail please see Page No: 3& 4) • **Job market** • **Course Applications** • **Institute/work ethics** **Use of personal protective equipment** • Demonstration uses of PPE's equipment **Use tools and equipment** • Identify the tool and select right tools for right job • Demonstration safe use of tools and equipment. • Maintain and / or replace tool insulation • Clean and store electrical tools insulation, equipment and material. **Identify hazards associated with electricity** • Describe electricity hazards • Apply the protection procedures for electric shock **Identify safety signs, symbols and regulations** • Identify safety signs and symbols associated with electricity hazards • Identify and interpret safety and other regulatory requirements **Safety precaution when working with electricity** • Identify the uses of equipment with frayed cords • Identify working area • Power supply while working • Use of ladder	• **Task 1** • **Task 2** • **Task 3** *Details may be seen at Annexure-I*

Week 2	**Electrical Theory-I**	**Success stories (** *For further detail please see Page No: 3& 4)*
		
		Describe basic electrical concepts
		• Demonstrate knowledge of electron theory
		• Definition of matter
		• Different states of matter with examples
		• Definition of atom, molecule and element
		• Atomic structure and shells
		• Description of proton, electron and neutron
		• Definition of valence and free electrons
		• Properties of positive and negative charge
		• Definition of electricity
		Describe current flow
		• Conventional current and electron flow theory
		• Static and dynamic charge
		Describe conductor, semi-conductor and Insulator.
		• Properties of conductors, insulators and semiconductors
		• Different type of material
		• Atomic structure
		• Current flowing ability
		• Types of diodes, e.g.
		  ○ Photodiode
		  ○ Reversing diode
		  ○ Blocking diode
		Some important definition
		• Motor
		• Generator
		• Transformer
		• Voltage
		• Current
		• Resistance
		• Fuse
		• Breaker
		• Inductor
		• Capacitor
		• Wire
		• Cable
		• Wiring system
		• Power factor
			• **Task 4**
			• **Task 5**
			Details may be seen at Annexure-I

		Describe factors affecting resistance of conductors • Definition of resistivity • Resistivity of materials • Factors affecting resistance of conductors • Calculating resistance of a conductor with regard to cross sectional area, length, resistivity and operating temperature **Apply Ohm's law for DC circuits** • Definition • Laws of resistance • Relation between current (I), voltage (V) and resistance (R) **Calculate electrical quantities in DC circuits based on Ohm's Law** • Ohm's law wheel o Calculating voltage o Calculating current o Calculating resistance • Calculating power	
Week 3	**Electrical Theory-II**	**Motivational Lecture** (For further detail please see Page No: 3& 4) **Describe sources of electricity generation** • Sources of electricity generation o Hydro electric o Thermal electric o Nuclear electric o Electrochemistry o Photovoltaic effect o Tidal source o Piezoelectric effect o Bio Gas • Definition of AC and DC **electricity** • Varying/sinusoidal nature of current and voltage in AC • Non-varying/uniform nature of current and voltage in DC • Importance of polarity in DC circuits	

	Electrical Theory-III	**Series and parallel and combination series and parallel Circuit and its calculation**
		• Circuit layout
		  ○ Series
		  ○ Parallel
		  ○ Series and Parallel
		• Circuit characteristics
		  ○ Voltage
		  ○ Current
		  ○ Resistance
		• Fault finding procedures
		Calculate electrical quantities in series and parallel circuits
		• Series and parallel wheel
		  ○ Calculating voltage
		  ○ Calculating current
		  ○ Calculating resistance
		  ○ Calculating power
			• **Task 6**
			Details may be seen at Annexure-I

Week 4	**Electrical Theory-IV**	**Success stories (** *For further detail please see Page No: 3& 4)* **Perform measurements in electrical circuits and Identify digital and analogue instruments** • Definition of analog and digital instrument • Examples of analogue and digital displayed instruments • Use of clamp ON meter(multimeter) analog and digital • Use of multi-meter digital and analog meter **Scale Reading** • Identification of millimeter inch, feet, millimeter, meter • Identification and using of micrometer • Identification and using of Vanier clipper **Measure current, voltage in AC/DC circuit and also resistance** • Uses of Multi meter • Measure current • Measure voltage • Measure Resistance • Continuity test	• **Task 7** • **Tasks 8** • **Tasks 9** • **Task 10** • **Tasks 11** • **Tasks 12** • **1st monthly test** *Details may be seen at Annexure-I*

		Measure frequency of AC circuit • Functioning of oscilloscope • Hertz meter **Measure real and apparent power** • Definition of real, apparent and reactive power • Relationship between real, apparent and reactive power • Units of real/active, apparent and reactive power • Measuring real and apparent power **Measure voltage and frequency of single and three phase grid electricity** • Measuring single phase voltage of grid electricity • Measuring three phase voltage of grid electricity • Measuring frequency of grid electricity	
	Build your CV	Download professional CV template from any good site (https://www.coolfreecv.com or relevant) • Add Personal Information • Add Educational details • Add Experience/Portfolio • Add contact details/profile links •	
Week 5	**Electrical Theory-V**	**Motivational Lecture** (For further detail please see Page No: 3& 4) **Describe the different Type of Power Real power, Apparent Power and Reactive power** • Power triangle • Pythagoras theorem • Calculation of angle • Define the terms KVA, KVAR and KW **Measure power factor of grid electricity** • Calculate value of reactive power • Definition of power factor • Measuring power factor of main AC line	• **Task 13** • **Task 14** *Details may be seen at Annexure-I*

		State the advantages and disadvantages of low power factor and high power factor • KVA rating • Per unit cost • Power loss • High current • Increases expenses **Explain the causes of low power factor and techniques to improve it** • Causes of low power factor • Disadvantages of low power factor Techniques to improve power factor **Use of power analyzer and phase analyzer** • Use of power analyzer • Use of phase analyzer	
	Electrical Theory-VI	**Define resistance, capacitance and inductance** • Definition of resistance, capacitance and inductance • Units and symbols **Differentiate between resistive, inductive and capacitive loads** • Examples of resistive loads • Examples of inductive loads • Examples of capacitive load **Explain importance of electrostatic discharge (ESD)** • Definition of ESD • Adverse effects of ESD **Define permanent and temporary magnets** • Definition 'permanent magnets' • Definition 'temporary magnets' • Define the term 'flux' **Describe magnetic lines of force and list their characteristics** • Magnetic flux • Flux density • MMF • Permeability **Magnetic properties of different**	

		material • Iron • Steel • Copper • Plastic	

Week 6	**Electrical Theory-VII**	**Success stories (** *For further detail please see Page No: 3& 4)*
		Describe the knowledge of Domestic wiring system.
		• Definition
		• Explain the Type of wiring
		• Explain brief of Wiring Accessories
		  ○ Type of fuse and its rating
		  ○ Type of Breaker and its rating
		  ○ Types Wire/cable and ratings chart
		  ○ PVC Pipe/duct size and capacity
		  ○ Distribution box size and number of breaker consistence on it.
		• Protection of wiring system
		• Advantages and disadvantages of different type of wiring system
		Describe the short knowledge of industrial wiring system.
		• Definition
		• Type of wiring
		• Wiring Accessories
		• Protection of wiring system
		• Advantages and disadvantages of different type of wiring system
			• **Task 15**
			• **Task 16**
			• **Tasks 17**
			• **Tasks 18**
			• **Tasks 19**
			• **Tasks 20**
			Details may be seen at Annexure-I

Week 7	**Electrical Theory-VIII**	**Motivational Lecture** (For further detail please see Page No: 3& 4) **Selection criteria of electrical component and accessory according to standard.** • Size of wire and cable • Size and Number of fan according to area • Size and Rating of Breaker • Size of PVC pipe. • Size of distribution Box according to the house plan • Size, Number and selection of light. • Size of AC according to the area. • Size of cable for AC • Size of power plug for AC • Size of breaker for AC	• **Task 21** • **Task 22** • **Task 23** • **Task 24** • **Task 25** • **Task 26** • **Task 27** • **Task 28** • **Task 29** • **Task 30** • **TASK 31** *Details may be seen at Annexure-I*

		• Size of Magnetic contactor • Size of thermal overload relay. • Selection of power factor panel rating. • Size of capacitor bank. • Size of solar panel • Size of charge controller • Size of inverter • Size of battery bank according to backup demand.	
Week 8	**Jointing and splicing/soldering of wire and Cable**	**Success stories (** *For further detail please see Page No: 3& 4)* **Making Joints of wire** **1/0.044** **3/0.029** **3/0.036** **7/0.029 to 7/0.052.** • Straight joint • Married joint • T- Joint • Cross joint • Britannia joint **Splicing/ soldering** • Heating of cable • Pasting/brozing of cable • Soldering of wire on cable	• **Task 32** • **Task 33** • **Task 34** • **Task 35** • **Task 36** *Details may be seen at Annexure-I*
Week 9	**Electrical Circuit and Installation**	**Motivational Lecture** (For further detail please see Page No: 3& 4) **Demonstrate knowledge of circuit making concepts** Loose connection of basic circuit making • Control single lamp with single way switch • Control two lamp with single one way switch • Control two lamp with two single pole switch • Control two lamp with single two way switch • Control single lamp and socket with two different switch • Control three lamp and single socket with four single pole switch • Control single lamp and three sockets with two single pole switch • Control single light plug • Control power plug • Go down circuit	• **Task 37** • **Task 38** • **Task 39** • **Task 40** • **Task 41** • **Task 42** • **Task 43** • **Task 44** • **Task 45** • **Task 46** • **2nd monthly test** *Details may be seen at Annexure-I*

Week 10	**Installation of single phase circuit-I**	**Success stories (** *For further detail please see Page No: 3& 4)* **Demonstrate knowledge of circuit** • Layout plan • Dimensioning • Installation • Fixing of component • Jointing • Function of circuits • Control circuit power circuit **Layout plan, dimensioning, installation** • Making of lamp switch circuit • Making of two way circuit • Making of 2 lamps multi switch circuit • Making of multi switch sockets circuit • Intermediate switch installation • Making of series test board	• **Task 47** • **Task 48** • **Task 49** • **Task 50** • **Task 51** • **Task 52** • *Details may be seen at Annexure-I*
Week 11	**Installation of single phase circuit-II**	**Motivational Lecture** (For further detail please see Page No: 3& 4) **Demonstrate knowledge of circuit** • Kitchen installation • Drawing room installation • Sleeping room installation • Hall installation • Impulse switch installation • Trembler bell installation • Bell indicator installation • Fluorescent lamp installation • Installation of energy meter	• **Task 53** • **Task 54** • **Task 55** • **Task 56** • **Task 57** • **Task 58** • **Task 59** • **Task 60** • **Task 61** *Details may be seen at Annexure-I*

Week 12	**Installation of three phase circuit-I**	**Success stories (** *For further detail please see Page No: 3& 4)* **Demonstrate knowledge of circuit** • Layout plan • Dimensioning • Installation • Fixing of component • Jointing • Function of circuits • Control circuit power circuit **3-Phase circuit-I** • Installation of three phase energy meter • Making of 3-phase motor connection ON/OFF by drum switch • Making of 3-phase motor connection Reverse forward by drum switch • Making of 3-phase motor connection Star/Delta by drum switch • Making of 3-phase motor connection 2-speed by drum switch • Making of 3-phase motor connection ON/OFF by CAM switch • Making of 3-phase motor connection Reverse forward by CAM switch • Making of 3-phase motor connection Star/Delta by CAM switch • Making of 3-phase motor connection 2-speed by CAM switch	• **Task 62** • **Task 63** • **Task 64** • **Task 65** • **Task 66** • **Task 67** • **Task 68** • **Task 69** *Details may be seen at Annexure-I*
Week 13	**Midterm**		
Week 14	**Installation of three phase circuit-II**	**Success stories (** *For further detail please see Page No: 3& 4)* **Installation of three phase circuit-2** • Making of 3-phase motor connection ON/OFF by CAM switch • Making of 3-phase motor connection Reverse forward by CAM switch • Making of 3-phase motor connection Star/Delta by CAM switch	• **Task 70** • **Task 71** • **Task 72** • **Task 73** *Details may be seen at Annexure-I*

		• Making of 3-phase motor connection 2-speed by CAM switch	
Week 15	**Installation of three phase circuit-III**	**Motivational Lecture** (For further detail please see Page No: 3& 4) **3-phase circuit-III** • Making of 3-phase motor connection ON/OFF by magnetic contactor • Making of 3-phase motor connection Reverse /forward by magnetic contactor • Making of 3-phase motor connection Star / Delta by Magnetic contactor	• **Task 74** • **Task 75** • **Task 76** *Details may be seen at Annexure-I*
Week 16	**Installation of three phase circuit-IV**	**Success stories (** *For further detail please see Page No: 3& 4)* **3-phase circuit-IV** • Making of 3-phase motor connection 2-speed by magnetic contactor • Making of 3-phase motor connection reverse/forward and Star/ Delta by magnetic contactor • Automatic transfer supply switch	• **Task 77** • **Task 78** • **Task 79** *Details may be seen at Annexure-I*
	Introduction to Freelancing	• **Motivational Lecture** *(For further detail please see Page No: 3& 4)* Students are introduced to: • the concept of freelancing • how to become freelance and create a sustainable income • pros and cons of freelancing • the ethical and professional way of becoming a productive freelancer • resources available for freelancing in the field of design • how to join freelancing sites the process of creating a freelancing profile	
Week 17	**Testing and Troubleshooting-I**	**Motivational Lecture** (For further detail please see Page No: 3& 4) **Explain the purpose of visual inspection** • Damage identification o cracks	• **Task 80** • **Task 81** • **Task 82** *Details may be*

		○ disorders(shape &structure) • broken parts **Demonstrate procedure for implementing testing** • Process of different tests • Electrical parameters **Demonstrate testing procedures for solar system** • Test solar cell • Solar plates test • Blocking diode test • Voc,Ise.Vsc **Interpret test results** • Interpretation of drawings and circuit diagrams **Implement troubleshooting procedures and identify fault** • Troubleshooting • Electrical and electronic parameters **List the problem that may occur when test motor** • Winding insulation fault • Bearing problem • Coupling fault • Rotor stator vibration fault	*seen at Annexure-I*
Week 18	**Testing and Troubleshooting-II**	**Success stories (** *For further detail please see Page No: 3& 4)* **Domestic Wiring Testing Method** Wiring testing and troubleshooting • Continuity test • Open circuit test • Short circuit test • Insulation resistance leakage test • Earth continuity test **Remove faults** Carry out operational testing • Product knowledge; • Testing procedures and equipment **Explain the reason for short circuit and leakage current** • Breakage of natural and phase • Short circuits between Phase natural	• **Task 83** • **Task 84** • **Task 85** • **Task 86** • **Task 87** • **Task 88** *Details may be seen at Annexure-I*

		• Insulation break of cable • Temperature effect • Load increases • Low quality cable, material • Un-awareness **Identify the fault finding techniques** • Visual inspection • Technical inspection	
Week 19	**Off/On-grid and hybrid solar PV system**	**Motivational Lecture** (For further detail please see Page No: 3& 4) **Describe the benefits of PV systems** Explain the advantages of solar power • Power generation and environmental benefits o No greenhouse gases, no harmful emission o No air pollution o No soil damage o No noise • Natural way to produce energy • Easy installation and little maintenance (cost) • Long life timespan **Explain the disadvantages of solar power** • Dependent on sun light • DC to AC conversion • May require large areas • Solar panel efficiency **Define the term 'solar radiation'** • Definition of 'radiation' • Light photons **Define the term 'photovoltaic effect'** • Definition of 'photovoltaic effect' **Describe operation of a basic PV system** • Energy source • Energy conversion • Energy inversion and conditioning • Energy storage • Energy distribution • Energy use • Electric utility **Define the term 'on -grid/off-grid and**	• **Task 89** • **Task 90** *Details may be seen at Annexure-I*

		hybrid PV system
		• Definition of 'on-grid'
		• Definition 'off-grid'
		• Definition of 'hybrid"
		  ○ Advantages
		  ○ Disadvantages
		• Net monitoring	

Week 20	**Off-Grid solar power plant**	**Success stories (** *For further detail please see Page No: 3& 4)* **Demonstrate knowledge of off-grid PV systems** • Types of grid • Need for off-grid systems Basic protection AC/DC **Identify PV components and describe their function in an off-grid PV solar system** • Solar panels and tilt angle • Type of solar penal • Charge controller • Battery banks • Inverter • Type of DC cables • Energy meter bidirectional • Circuit Breaker • Earthing **Selection of components according to the load and backup Requirement** • Load calculation **Battery size** • Batteries Backups calculation • Size of batteries according to backup demand **Size of Inverter** • Inverter rating/size according to load demand • Inerter MPPT operational range • Inverter PV supportive rating **Size of Cable** • Selection of Cable Rating according to PV Current and Voltage • Selection of cable according to load segregation or AC Load from inverter **PV solar panel selection** • PV selection according to the Inverter specification	• **Task 91** • **Task 92** • **Task 93** • **Task 94** • **Task 95** • **Task 96** • **Task 97** • **Task 98** • **Task 99** • **Task 100** • **Task 101** • **Task 102** *Details may be seen at Annexure-I*

		• PV open circuit voltage according to MPPT charge controller range or inverter MPPT operational range • PV strings current rating according to load demand and inverter rating **PV solar panel stands/Fixture** • Readymade • Type of stands • Cage of stands • According to wind pressure or weather **Breaker size** • Input AC breaker of inverter • Output AC breaker of inverter for load side • PV Solar DC breaker **Size of Ducts** • According to cables • According to building structure internal or external **Size of Distribution Box** • Type of DB (steel or plastic) • Size of DB (according to No of breakers) **Size of Selector switch** • According current rating • According to mode selection • According to Area **Battery terminal** • According to current • According to terminal of battery • According to No of batteries **Installation/ commissioning of solar power plant** • Install PV panels with stands • Installation of Inverter • Installation of batteries • Installation of distribution box • Installation of selector switch • Load sharing and balancing • Ducts fixing • Laying of cable • Connection of AC and DC breaker	
Week 21	**On-Grid solar power plant**	**Motivational Lecture** (For further detail please see Page No: 3& 4) **Demonstrate knowledge of off-grid PV systems**	• **Task 103** • **Task 104** • **Task 105**

		• Types of grid • Need for off-grid systems Basic protection AC/DC **Identify PV components and describe their function in an off-grid PV solar system** • Solar panels • Type of solar penal • Charge controller • Inverter • Type of DC cables • Energy meter bidirectional • Reverse current relay • Circuit Breaker • Earthing **Selection of components according to the load and backup Requirement :** • Load calculation **Size of Inverter** • Inverter rating/size according to load demand • Inerter MPPT operational range • Inverter PV supportive rating **Size of Cable** • Selection of Cable Rating according to PV Current and Voltage • Selection of cable according to load segregation or AC Load from inverter **PV solar panel selection** • PV selection according to the Inverter specification • PV open circuit voltage according to MPPT charge controller range or inverter MPPT operational range • PV strings current rating according to load demand and inverter rating **PV solar panel stands/Fixture** • Readymade • Type of stands • Cage of stands • According to wind pressure or weather **Bidirectional energy meter** • According to power	• **Task 106** • **Task 107** • **Task 108** • **Task 109** • **Task 110** • **Task 111** • **Task 112** *Details may be seen at Annexure-I*

		• According to current • According to phases **Breaker size** • Input AC breaker of inverter • Output AC breaker of inverter for load side • PV Solar DC breaker **Size of Ducts** • According to cables • According to building structure internal or external **Size of Distribution Box** • Type of DB (steel or plastic) • Size of DB (according to No of breakers) **Size of Selector switch** • According current rating • According to mode selection • According to Area **Battery terminal** • According to current • According to terminal of battery • According to No of batteries **Installation of solar power plant** • Install PV panels with stands • Installation of Inverter • Installation of distribution box • Installation of selector switch • Load sharing and balancing • Ducts fixing • Laying of cable • Connection of AC and DC	
Week 22	**Hybrid solar power plant**	**Success stories (** *For further detail please see Page No: 3& 4)* **Demonstrate knowledge of off-grid PV systems** • Types of grid • Need for hybrid-grid systems Basic protection AC/DC **Identify PV components and describe their function in an Hybrid-grid PV solar system** • Solar panels • Type of solar penal • Charge controller • Battery banks • Inverter • Type of DC cables	• **Task 113** • **Task 114** • **Task 115** • **Task 116** • **Task 117** • **Task 118** • **Task 119** • **Task 120** • **Task 121** • **Task 122**

		• Energy meter bidirectional • Circuit Breaker • Earthing **Selection of components according to the load and backup Requirement :** • Load calculation **Battery size** • Batteries Backups calculation • Size of batteries according to backup demand **Size of Inverter** • Inverter rating/size according to load demand • Inerter MPPT operational range • Inverter PV supportive rating **Size of Cable** • Selection of Cable Rating according to PV Current and Voltage • Selection of cable according to load segregation or AC Load from inverter **PV solar panel selection** • PV selection according to the Inverter specification • PV open circuit voltage according to MPPT charge controller range or inverter MPPT operational range • PV strings current rating according to load demand and inverter rating **PV solar panel stands/Fixture** • Readymade • Type of stands • Cage of stands • According to wind pressure or weather **Bidirectional energy meter** • According to power • According to current • According to phases **Breaker size** • Input AC breaker of inverter • Output AC breaker of inverter for load side • PV Solar DC breaker **Size of Ducts** • According to cables	• **Task 123** • **Task 124** *Details may be seen at Annexure-I*

		• According to building structure internal or external **Size of Distribution Box** • Type of DB (steel or plastic) • Size of DB (according to No of breakers) **Size of Selector switch** • According current rating • According to mode selection • According to Area **Battery terminal** • According to current • According to terminal of battery • According to No of batteries **Installation of solar power plant** • Install PV panels with stands • Installation of Inverter • Installation of batteries • Installation of distribution box • Installation of selector switch • Load sharing and balancing • Ducts fixing • Laying of cable • Connection of AC and DC • Installation of bidirectional meter	

Week 23	**Maintain Off/On-grid and hybrid PV systems and components**	**Motivational Lecture** (For further detail please see Page No: 3& 4)
		
		Interpret circuit diagram for off-grid On-grid and hybrid PV Solar operation
		• Drawings
		• Symbols
		• Specifications
		Outline safety measures associated with PV system maintenance
		• Never work alone
		• Know the system
		• Condition of tools and test equipment
		• Personal protective Equipment's
		  ○ Safety hat
		  ○ Eye protection
		  ○ Dry leather gloves
		• Be aware when working on heights
		• Measure first
		  ○ Conductivity
		  ○ Voltage
		  ○ Current
			• **Task 125**
			• **Task 126**
			• **Task 127**
			
			Details may be seen at Annexure-I

		Replace or repair faulty parts or components • Repair or replacing procedures • Trouble shooting of inverter • Trouble shooting of cable short/open circuit • Trouble shooting of charge controller • PV testing Voc,Vse,Ise • Batteries testing On charging ,on discharging, electrolyte testing, Gravity test **List the tools required for installation solar panels** • Radiant meter • Compass • Volt meter • Clamp meter • Hammer • Nut bolts • Metal frame • Drill machine • Lux meter • Tool kit	
Week 24	**Apply continuing professional development**	**Success stories (** *For further detail please see Page No: 3& 4)* **Identity professional development needs** **Discuss professional development needs** • Reason s for professional development **Identify professional development programs** • Access to programs • Career guidance	• **Task 128** *Details may be seen at Annexure-I*
	Develop professional knowledge, skills and attitudes	**Participate in training programs** • Outcomes and relevance of training **Document training outcome** • Report and portfolio writing	
	Maintain professional proficiency	**Identify and use self-study sources** • Research methods • Access to sources	

		Implement self-study plan • Planning your career	
Week 25	**How to search and apply for jobs in at least two labor marketplace countries (KSA, UAE, etc.)**	**Motivational Lecture** (For further detail please see Page No: 3& 4) • Browse the following website and create an account on each website ✓ Bayt.com – The Middle East Leading Job Site ✓ Monster Gulf – The International Job Portal ✓ Gulf Talent – Jobs in Dubai and the Middle East • Find the handy 'search' option at the top of your homepage to search for the jobs that best suit your skills. • Select the job type from the first 'Job Type' drop-down menu, next, select the location from the second drop- down menu. • Enter any keywords you want to use to find suitable job vacancies. • On the results page you can search for part-time jobs only, full-time jobs only, employers only, or agencies only. Tick the boxes as appropriate to your search. • Search for jobs by: ✓ Company ✓ Category ✓ Location ✓ All jobs ✓ Agency ✓ Industry	**Task 129** *Details may be seen at Annexure-I*
Week 26	**Entrepreneurship and Final Assessment in project**	• **Success stories (** *For further detail please see* Page *No: 3& 4)* • Job Market Searching • Self-employment • Introduction	**Final Assessment**

		• Fundamentals of Business Development • Entrepreneurship • Startup Funding • Business Incubation and Acceleration • Business Value Statement • Business Model Canvas • Sales and Marketing Strategies • How to Reach Customers and Engage • Stakeholders Power Grid • RACI Model, SWOT Analysis, PEST Analysis • SMART Objectives • OKRs • Cost Management (OPEX, CAPEX, ROCE, etc.)	
	Final Assessment		

Tasks For Certificate in Building electrician and solar PV technician ***Annexure-I***

Task No.	Task	Description	Week
1.	**Health And safety**	• Use and wearing of Personal protective equipment • safety precautions when working with electricity	**Week 1**

2.		• Identify the tools and Use of tools and equipment • Identify hazards associated with electricity	
3.		• Identify safety signs, symbols and regulations •	
4.	**Electrical Theory**	• Describe factors affecting resistance of conductors •	**Week 2**
5.		• Calculate electrical quantities in DC circuits based on Ohm's Law	
6.		• Series and parallel and combination series and parallel Circuit and its calculation	**Week 3**
7.		• Identification of millimeter inch, feet, millimeter, meter •	**Week 4**
8.		• Identification and using of micrometer	
9.		• Identification and using of Vanier clipper	
10.		• Uses of Multi meter • Measure current • Measure voltage • Measure Resistance • Continuity test	
11.		• Functioning of oscilloscope	
12.		• Hertz meter	
13.		• Use of power analyzer single phase	**Week 5**
14.		• Use of power analyzer three phase	
15.		• Explain the Type of wiring • Casing capping wiring • Conduit wiring • Batten wiring	**Week 6**
16.		• Type of fuse and its rating	
17.		• Type of Breaker and its rating	
18.		• Types Wire/cable and ratings chart	
19.		• PVC Pipe/duct size and capacity	

20.		• Distribution box size and number of breaker consistence on it	
21.		• Calculate Size of wire and cable	**Week 7**
22.		• Calculate Size and Number of fan according to the given area	
23.		• Size and Rating of Breaker	
24.		• Size of PVC pipe.	
25.		• Size of distribution Box according to the house plan	
26.		• Size, Number and selection of light.	
27.		• Size of AC according to the area.	
28.		• Size of Magnetic contactor	
29.		• Size of thermal overload relay.	
30.		• Selection of power factor panel rating	
31.		• Size of capacitor bank	**Week 8**
32.		• Straight joint	
33.		• T- Joint	
34.		• Married joint	
35.		• Cross joint	
36.		• Britannia joint	
37.	**Electrical Circuit and Installation**	• Control single lamp with single way switch	**Week 09**
38.		• Control two lamp with single one way switch •	
39.		• Control two lamp with two single pole switch	
40.		• Control two lamp with single two way switch	
41.		• Control single lamp and socket with two different switch	
42.		• Control three lamp and single socket with four single pole switch	
43.		• Control single lamp and three sockets with two single pole switch	
44.		• Control single light plug	
45.		• Control power plug	
46.		• Go down circuit	
47.	**Installation of single**	• Making of lamp switch circuit	**Week 10**
48.		• Making of two way circuit	

49.	**phase circuit-I**	• Making of 2 lamps multi switch circuit	
50.		• Making of multi switch sockets circuit	
51.		• Intermediate switch installation	
52.		• Making of series test board	
53.	**Installation of single phase circuit-II**	• Kitchen installation	**Week 11**
54.		• Drawing room installation	
55.		• Sleeping room installation	
56.		• Hall installation	
57.		• Impulse switch installation	
58.		• Trembler bell installation	
59.		• Bell indicator installation	
60.		• Fluorescent lamp installation	
61.		• Installation of energy meter	
62.	**Installation of three phase circuit-I**	• Installation of three phase energy meter	**Week 12**
63.		• Making of 3-phase motor connection ON/OFF by drum switch	
64.		• Making of 3-phase motor connection Reverse forward by drum switch	
65.		• Making of 3-phase motor connection Star/Delta by drum switch	
66.		• Making of 3-phase motor connection 2-speed by drum switch	
67.		• Making of 3-phase motor connection ON/OFF by CAM switch	
68.		• Making of 3-phase motor connection Reverse forward by CAM switch	
69.		• Making of 3-phase motor connection Star/Delta by CAM switch	
Midterm test			**Week 13**
70.	**Installation of three phase circuit-II**	• Making of 3-phase motor connection ON/OFF by CAM switch	**Week 14**
71.		• Making of 3-phase motor connection Reverse forward by CAM switch	

72.		• Making of 3-phase motor connection Star/Delta by CAM switch	
73.		• Making of 3-phase motor connection 2-speed by CAM switch	
74.	**Installation of three phase circuit-III**	• Making of 3-phase motor connection ON/OFF by magnetic contactor	**Week 15**
75.		• Making of 3-phase motor connection Reverse /forward by magnetic contactor	
76.		• Making of 3-phase motor connection Star / Delta by Magnetic contactor	
77.	**Installation of three phase circuit-IV**	• Making of 3-phase motor connection 2-speed by magnetic contactor	**Week 16**
78.		• Making of 3-phase motor connection reverse/forward and Star/ Delta by magnetic contactor	
79.		• Automatic transfer supply switch	
80.	**Testing and Troubleshooting-I**	• visual inspection	**Week 17**
81.		• Demonstrate testing procedures for solar system	
82.		• Demonstrate testing procedures for Motor control panel	
83.	**Testing and Troubleshooting-II**	• Continuity test	**Week 18**
84.		• Open circuit test	
85.		• Short circuit test	
86.		• Insulation resistance leakage test	
87.		• Earth continuity test	
88.		• Remove faults according to product knowledge	
89.	**Off/On-grid and hybrid solar PV system**	• Identify and display the accessories of solar power plant	**Week 19**
90.		• Identify and display the Ratings of solar power plant	
91.	**Off-Grid solar power plant**	• Identify PV components and describe their function in an off-grid PV solar system	**Week 20**
92.		• Selection of components according to the load and backup Requirement	

93.		• Install PV panels with stands	
94.		• Installation of Inverter	
95.		• Installation of batteries	
96.		• Installation of distribution box	
97.		• Installation of selector switch	
98.		• Load sharing and balancing	
99.		• Ducts fixing	
100.		• Laying of cable	
101.		• Connection of AC and DC breaker	
102.		• Installation of solar charge controller MPPT	
103.	**On-Grid solar power plant**	• Identify PV components and describe their function in an off-grid PV solar system	**Week 21**
104.		• Selection of components according to the load	
105.		• Install PV panels with stands	
106.		• Installation of Inverter	
107.		• Installation of distribution box	
108.		• Installation of selector switch	
		• Load sharing and balancing	
109.		• Ducts fixing	
110.		• Laying of cable	
111.		• Connection of AC and DC breaker	
112.		• Installation of bidirectional meter	
113.	**Hybrid solar power plant**	• Identify PV components and describe their function in an off-grid PV solar system	**Week 22**
114.		• Selection of components according to the load	
115.		• Install PV panels with stands	
116.		• Installation of Inverter	
117.		• Installation of batteries bank	
118.		• Installation of distribution box	
119.		• Installation of selector switch	
120.		• Load sharing and balancing	
121.		• Ducts fixing	
122.		• Laying of cable	
123.		• Connection of AC and DC breaker	
124.		• Installation of bidirectional meter	
125.	**Maintain Off/On-grid and hybrid PV systems and components**	• Interpret circuit diagram for off-grid On-grid and hybrid PV Solar operation	**Week 23**
126.		• Outline safety measures associated with PV system	

		maintenance	
127.		• Replace or repair faulty parts or components	
128.	**Apply continuing professional development**	• Identity professional development needs • Discuss professional development needs • Identify professional development programs	**Week 24**
129.	**How to search and apply for jobs in at least two labor marketplace countries (KSA, UAE, etc.)**	• Browse the following website • Uv learning jobs • Paper Pk • Read news paper • Bayt.com • Monster Gulf • Gulf Talent • online job search websites	**Week 25**
130.	**Entrepreneurship and Final Assessment in project**	• Job Market Searching • Self-employment • Introduction • Fundamentals of Business Development • Entrepreneurship • Startup Funding • Business Incubation and Acceleration • Business Value Statement **Final Assessment**	**Week 26**

Annexure-II

SUGGESTIVE FORMAT AND SEQUENCE ORDER OF MOTIVATIONAL LECTURE.

Mentor

Mentors are provided an observation checklist form to evaluate and share their observational feedback on how students within each team engage and collaborate in a learning environment. The checklist is provided at two different points: Once towards the end of the course. The checklists are an opportunity for mentors to share their unique perspective on group dynamics based on various team activities, gameplay sessions, pitch preparation, and other sessions, giving insights on the nature of communication and teamwork taking place and how both learning outcomes and the student experience can be improved in the future.

Session- 1 (Communication):

Please find below an overview of the activities taking place Session plan that will support your delivery and an overview of this session's activity.

Session- 1 OVERVIEW
Aims and Objectives:
• To introduce the communication skills and how it will work • Get to know mentor and team - build rapport and develop a strong sense of a team • Provide an introduction to communication skills • Team to collaborate on an activity sheet developing their communication, teamwork, and problem-solving • Gain an understanding of participants' own communication skills rating at the start of the program

Activity:	**Participant Time**	**Teacher Time**	**Mentor Time**
Intro Attend and contribute to the scheduled.			
Understand good communication skills and how it works.			
Understand what good communication skills mean			
Understand what skills are important for good communication skills			
Key learning outcomes:	**Resources:**		**Enterprise skills developed:**
• Understand the communication skills and how it works. • Understand what communication skills mean • Understand what skills are important for communication	• Podium • Projector • Computer • Flip Chart • Marker		• Communication • Self Confidence • Teamwork

skills		

Schedule	Mentor Should do
Welcome: **5 min**	Short welcome and ask the **Mentor** to introduce him/herself. Provide a brief welcome to the qualification for the class. Note for Instructor: Throughout this session, please monitor the session to ensure nothing inappropriate is being happened.
Icebreaker: **10 min**	Start your session by delivering an icebreaker, this will enable you and your team to start to build rapport and create a team presentation for the tasks ahead. The icebreaker below should work well at introductions and encouraging communication, but feel free to use others if you think they are more appropriate. It is important to encourage young people to get to know each other and build strong team links during the first hour; this will help to increase their motivation and communication throughout the sessions.
Introduction & Onboarding: **20mins**	Provide a brief introduction of the qualification to the class and play the "Onboarding Video or Presentation". In your introduction cover the following: 1. Explanation of the program and structure. (Kamyab jawan Program) 2. How you will use your communication skills in your professional life. 3. Key contacts and key information – e.g. role of teacher, mentor, and SEED. Policies and procedures (user agreements and "contact us" section). Everyone to go to the Group Rules tab at the top of their screen, read out the rules, and ask everyone to verbally agree. Ensure that the consequences are clear for using the platform outside of hours. (9am-8pm) 4. What is up next for the next 2 weeks ahead so young people know what to expect (see pages 5-7 for an overview of the challenge). Allow young people to ask any questions about the session topic.
Team Activity Planning: **30 minutes**	MENTOR: Explain to the whole team that you will now be planning how to collaborate for the first and second collaborative Team Activities that will take place outside of the session. There will not be another session until the next session so this step is required because communicating and making decisions outside of a session requires a different strategy that must be agreed upon so that everyone knows what they are doing for this activity and how. • "IDENTIFY ENTREPRENEURS" TEAM ACTIVITY • "BRAINSTORMING SOCIAL PROBLEMS" TEAM ACTIVITY" *As a team, collaborate on a creative brainstorm on social problems in your community. Vote on the areas you feel most passionate about as a team, then write down what change you would like to see happen.* Make sure the teams have the opportunity to talk about how they want to work as a team through the activities e.g. when they want to complete the activities, how to communicate, the role of the project manager, etc. Make sure you allocate each young

	person a specific week that they are the project manager for the weekly activities and make a note of this. Type up notes for their strategy if this is helpful - it can be included underneath the Team Contract.
Session Close: **5 minutes**	**MENTOR:** Close the session with the opportunity for anyone to ask any remaining questions. **Instructor:** Facilitate the wrap-up of the session. A quick reminder of what is coming up next and when the next session will be.

MOTIVATIONAL LECTURES LINKS.

TOPIC	SPEAKER	LINK
How to Face Problems In Life	Qasim Ali Shah	https://www.youtube.com/watch?v=OrQte08MI90
Just Control Your Emotions	Qasim Ali Shah	https://www.youtube.com/watch?v=JzFs__yJt-w
How to Communicate Effectively	Qasim Ali Shah	https://www.youtube.com/watch?v=PhHAQEGehKc
Your ATTITUDE is Everything	Tony Robbins Les Brown David Goggins Jocko Willink Wayne Dyer Eckart Tolle	https://www.youtube.com/watch?v=5fS3rj6eIFg
Control Your EMOTIONS	Jim Rohn Les Brown TD Jakes Tony Robbins	https://www.youtube.com/watch?v=chn86sH0O5U
Defeat Fear, Build Confidence	Shaykh Atif Ahmed	https://www.youtube.com/watch?v=s10dzfbozd4
Wisdom of the Eagle	Learn Kurooji	https://www.youtube.com/watch?v=bEU7V5rJTtw
The Power of ATTITUDE	Titan Man	https://www.youtube.com/watch?v=r8LJ5X2ejqU
STOP WASTING TIME	Arnold Schwarzenegger	https://www.youtube.com/watch?v=kzSBrJmXqdg
Risk of Success	Denzel Washington	https://www.youtube.com/watch?v=tbnzAVRZ9Xc

Annexure-III

SUCCESS STORY

S. No	Key Information	Detail/Description
1.	**Self & Family background**	**Muhammad suleman,** who lives in Rawalpindi, is an example of how hard work and perseverance can reap rich rewards when bidding for projects of Electrical in newly constructed smart cities. Building electrician and solar PV technician works exclusively on an open market platform and has earned, on average, **up to 60000** per month for the past several months. But this isn't a story of overnight success – **Muhammad suleman** has had to work hard to differentiate himself and stay true to his goal. It was a full year later, in November 2020, when **Muhammad suleman** finally decided to jump in. He signed up for one of the numerous landowners and people with small projects, like handling Electrical projects and Solar power plant installer, troubleshooting projects already commission by other company and commissioning of 3-phase Motor control panel design and commissioner. He had already started a small business to help pay for his college education, so he was nervous and apprehensive about the decision. "I gave myself two or three months at most. If I didn't succeed, then I would go back to running the business as it was showing potential," he says. **If at first, you don't succeed, try try again**
2.	**How he came on board NAVTTC Training/ or got trained through any other source**	Certification in Building Electrician and solar PV technician from STEPS(NAVTTC partner institute)
3.	**Post-training activities**	**Muhammad Suleman** area of expertise is in **Electrical technology (building electrician and solar PV technician).** But it wasn't so simple. In the first few weeks, he didn't hear back from even a single client, despite pitching for dozens of projects. "I needed to understand what worked, so I read blogs, participated in forums, and analyzed profiles of successful Electrical trade men. It was an uphill struggle, but I didn't want to give up," he explains. Muhammad suleman says he understands why clients

		would be apprehensive giving projects to untested technical men. They have hundreds of options to choose from, he explains, and to give a project to someone with no experience requires a strong leap of faith. A slow stream of projects started to come **Muhammad salesma**n's way. Within a few months, he was landing an average of a multiple projects every month, with a large number of repeat clients. He also expanded the range of his professional services, branching out company owner to companies. But he's had to face his fair share of challenges too. Rawalpindi, threatened to derail his building electrician and solar PV technician career. "Sometimes I haven't had connectivity for two days straight," he explains. "That's unthinkable for someone who makes his livelihood on the electrical business."
4.	**Message to others** **(under training)**	Take the training opportunity seriously Impose self-discipline and ensure regularity Make Hard work pays in the end so be always ready for the same.

Note: Success story is a source of motivation for the trainees and can be presented in several ways/forms in a NAVTTC skill development course as under: -

1. To call a passed out successful trainee of the institute. He will narrate his success story to the trainees in his own words and meet trainees as well.
2. To see and listen to a recorded video/clip (5 to 7 minutes) showing a successful trainee Audio-video recording that has to cover the above-mentioned points.*****
3. The teacher displays the picture of a successful trainee (name, trade, institute, organization, job, earning, etc) and narrates his/her story in the teacher's own motivational words.

***** *The online success stories of renowned professional can also be obtained from* ***Annex-II***

Annexure-IV:

Workplace/Institute Ethics Guide

Work ethic is a standard of conduct and values for job performance. The modern definition of what constitutes good work ethics often varies. Different businesses have different expectations. Work ethic is a belief that hard work and diligence have a moral benefit and an inherent ability, virtue, or value to strengthen character and individual abilities. It is a set of values-centered on the importance of work and manifested by determination or desire to work hard.

The following ten work ethics are defined as essential for student success:

1. **Attendance:**
   Be at work every day possible, plan your absences don't abuse leave time. Be punctual every day.
2. **Character:**
   Honesty is the single most important factor having a direct bearing on the final success of an individual, corporation, or product. Complete assigned tasks correctly and promptly. Look to improve your skills.
3. **Team Work:**
   The ability to get along with others including those you don't necessarily like. The ability to carry your weight and help others who are struggling. Recognize when to speak up with an idea and when to compromise by blend ideas together.
4. **Appearance:**
   Dress for success set your best foot forward, personal hygiene, good manner, remember that the first impression of who you are can last a lifetime
5. **Attitude:**
   Listen to suggestions and be positive, accept responsibility. If you make a mistake, admit it. Values workplace safety rules and precautions for personal and co-worker safety. Avoids unnecessary risks. Willing to learn new processes, systems, and procedures in light of changing responsibilities.
6. **Productivity:**
   Do the work correctly, quality and timelines are prized. Get along with fellows, cooperation is the key to productivity. Help out whenever asked, do extra without being asked. Take pride in your work, do things the best you know-how. Eagerly focuses energy on accomplishing tasks, also referred to as demonstrating ownership. Takes pride in work.
7. **Organizational Skills:**

Make an effort to improve, learn ways to better yourself. Time management; utilize time and resources to get the most out of both. Take an appropriate approach to social interactions at work. Maintains focus on work responsibilities.

8. **Communication:**

   Written communication, being able to correctly write reports and memos. Verbal communications, being able to communicate one on one or to a group.

9. **Cooperation:**

   Follow institute rules and regulations, learn and follow expectations. Get along with fellows, cooperation is the key to productivity. Able to welcome and adapt to changing work situations and the application of new or different skills.

10. **Respect:**

    Work hard, work to the best of your ability. Carry out orders, do what's asked the first time. Show respect, accept, and acknowledge an individual's talents and knowledge. Respects diversity in the workplace, including showing due respect for different perspectives, opinions, and suggestions.