



ELECTRICAL SYSTEMS DESIGN AND GREEN POWER (ESD & GP)

TRAINING CENTRE

(An Industry Recognized Training Centre)

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING
SREE VIDYANIKETHAN ENGINEERING COLLEGE



ELECTRICAL SYSTEMS DESIGN AND GREEN POWER

(ESD & GP)

TRAINING CENTRE

(An Industry Recognized Training Centre)

Joint-Outreach Internship / Training Program

on

**SOLAR PV POWER INFRASTRUCTURE AND
SOLUTIONS**

(11th to 13th February, 2019)

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

SREE VIDYANIKETHAN ENGINEERING COLLEGE

(An autonomous institution affiliated to JNTUA, Anantapuramu)

Sree Sainath Nagar, A. Rangampet, Tirupati – 517 102

ELECTRICAL SYSTEMS DESIGN & GREEN POWER (ESD & GP)-TRAINING CENTRE

(An Industry Recognized Training Centre)

About the Training Centre:

Electrical Systems Design & Green Power (ESD & GP)-Training Centre, an Industry Recognized Training Centre has been established by the Dept. of Electrical and Electronics Engineering, Sree Vidyanikethan Engineering College, Tirupati, with a motto to sprout and enhance the industry demanded academic skills among Students, Green Adaptive Professionals and Practicing Electrical Engineers.

In recognition with superior academic quality, organizational integrity, and like-mindedness of the mission of Electrical Systems Design and Green Power - Training Centre, established, **M/s. Advanced Ultra Power Transmission Consultancy (AUPTC)**, Gurgaon, India acknowledged the association with Sree Vidyanikethan Engineering College (SVEC) to organize Joint Certification Programs under Electrical Systems Design and Green Power - Training Centre at Sree Vidyanikethan Engineering College, Tirupati.

To introduce, AUPTC is a rapidly growing electrical system design and consultancy company in India. Over the years, it has been delivering excellence in Power Projects for Conventional as well as Renewable energy like Wind & Solar and has vast experience in Bipolar and Back-to-Back HVDC Systems up to $\pm 512\text{kV}$, 2500MW Air Insulated Substations ranging up to 765kV, Gas Insulated Substations (indoor & Outdoor) up to 400kV, Transmission lines ranging up to 765kV, FSC up to 400kV and Solar Power up to 1000MW.

The **Vision** of ESD & GP-Training Centre is to bridge the gap between 'Academia' and 'Industry' by offering professional skills training and utilizing the available resources within the Department ensuring superior academic quality and organizational integrity.



Training Program on SOLAR PV POWER INFRASTRUCTURE AND SOLUTIONS

About the Training Program:

As Initiation, 20 hours Certified Training Program on *Solar PV Power Infrastructure and Solutions* was offered *Free-of-Cost* for identified Meritorious Students from selected institutions and students of SVEC limiting to a batch of 20 students in the Month of February, 2019.

Training Outcome(s):

After successful completion of the course, the participants will be able to take-over and perform recourse assessment and complete electrical system design for Solar PV Power Systems up to off-grid level.

Training Attainment(s):

- Nine external and eleven internal student participants got trained successfully.
- For certification, they prepared and submitted complete PV system design for their own house/ accommodation as a report and expressed their confidence about Solar system design up to off-grid level.

Training Accomplishment Schedule:

- Stage 1: Conducting Trainee Pre-requisite questionnaire / Test to understand the knowledge base of the trainee / participant, and to modulate the level of training deliverables.
- Stage 2: Orientation on the Solar PV Power Industry.
- Stage 3: Class Room Training Sessions.
- Stage 4: Practical Demonstrations.
- Stage 5: Site Visit.
- Stage 6: Report Submission and Discussion.



FEEDBACK BY THE PARTICIPANTS, A FEW

SREE VIDYANIKETHAN ENGINEERING COLLEGE (AUTONOMOUS)
Sree Sainath Nagar, Tirupati-517102
Department of Electrical and Electronics Engineering
Electrical Systems Design and Green Power (ESD & GP) - Training Centre
(An Industry Recognized Training Centre)
Joint Outreach Internship / Training program on "Solar PV Power Infrastructure and Solutions"
11th to 13th Feb, 2019.

FEEDBACK FORM

1. Name of the Participant : *R B Yogananda Reddy*
2. College & Address : *SV college of engineering, Tirupati*

3. Please indicate ✓ for the following parameters

	YES	NO
a. Does the training program address the fundamentals of renewable energy and in particular Solar Energy?	<input checked="" type="checkbox"/>	<input type="checkbox"/>
b. Whether the scope for career prospects in the area of solar power infrastructure is elaborated or not?	<input checked="" type="checkbox"/>	<input type="checkbox"/>
c. Have you understood various solar power infrastructure elements, their customized applications and design aspects?	<input checked="" type="checkbox"/>	<input type="checkbox"/>
d. Will you be able to design solar PV power generation system as per the needs of customer?	<input checked="" type="checkbox"/>	<input type="checkbox"/>
e. Does the Trainer have sound knowledge on the topic?	<input checked="" type="checkbox"/>	<input type="checkbox"/>
f. Do you feel this training program is helpful?	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Your valuable Comments

came with zero knowledge on solar and had got a good sound on basics of solar PV Power infrastructure

R B Yogananda Reddy
Signature of the Participant

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FEEDBACK FORM

1. Name of the Participant : *A. PAWAN*
2. College & Address : *Sri Venkateswara College of Engineering, Tirupati*

3. Please indicate ✓ for the following parameters

	YES	NO
a. Does the training program address the fundamentals of renewable energy and in particular Solar Energy?	<input checked="" type="checkbox"/>	<input type="checkbox"/>
b. Whether the scope for career prospects in the area of solar power infrastructure is elaborated or not?	<input checked="" type="checkbox"/>	<input type="checkbox"/>
c. Have you understood various solar power infrastructure elements, their customized applications and design aspects?	<input checked="" type="checkbox"/>	<input type="checkbox"/>
d. Will you be able to design solar PV power generation system as per the needs of customer?	<input checked="" type="checkbox"/>	<input type="checkbox"/>
e. Does the Trainer have sound knowledge on the topic?	<input checked="" type="checkbox"/>	<input type="checkbox"/>
f. Do you feel this training program is helpful?	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Your valuable Comments

This Training Program is very helpful to me. The trainers boost up the confidence in the basis of designing field and its importance. I am very thankful to you all and Thankyou.

A. Pawan
Signature of the Participant

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FEEDBACK FORM

1. Name of the Participant : *C. SAI KUNYA*
2. College & Address : *SVPCEET & PUTTUR*

3. Please indicate ✓ for the following parameters

	YES	NO
a. Does the training program address the fundamentals of renewable energy and in particular Solar Energy?	<input checked="" type="checkbox"/>	<input type="checkbox"/>
b. Whether the scope for career prospects in the area of solar power infrastructure is elaborated or not?	<input checked="" type="checkbox"/>	<input type="checkbox"/>
c. Have you understood various solar power infrastructure elements, their customized applications and design aspects?	<input checked="" type="checkbox"/>	<input type="checkbox"/>
d. Will you be able to design solar PV power generation system as per the needs of customer?	<input checked="" type="checkbox"/>	<input type="checkbox"/>
e. Does the Trainer have sound knowledge on the topic?	<input checked="" type="checkbox"/>	<input type="checkbox"/>
f. Do you feel this training program is helpful?	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Your valuable Comments

This Internship/Training Program was Very helpful for me and Tgs for conducting this type of workshop. I got some knowledge about PV systems & these knowledge was helpful in my future.

C. Sai Kunya
Signature of the Participant

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FEEDBACK FORM

1. Name of the Participant : *N. PUNEETH KUMAR*
2. College & Address : *S.V. College of Engineering, Tirupathi*

3. Please indicate ✓ for the following parameters

	YES	NO
a. Does the training program address the fundamentals of renewable energy and in particular Solar Energy?	<input checked="" type="checkbox"/>	<input type="checkbox"/>
b. Whether the scope for career prospects in the area of solar power infrastructure is elaborated or not?	<input checked="" type="checkbox"/>	<input type="checkbox"/>
c. Have you understood various solar power infrastructure elements, their customized applications and design aspects?	<input checked="" type="checkbox"/>	<input type="checkbox"/>
d. Will you be able to design solar PV power generation system as per the needs of customer?	<input checked="" type="checkbox"/>	<input type="checkbox"/>
e. Does the Trainer have sound knowledge on the topic?	<input checked="" type="checkbox"/>	<input type="checkbox"/>
f. Do you feel this training program is helpful?	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Your valuable Comments

The Training Program was help full in Improving my Knowledge on Solar P.V systems. It will be more helpfull if we have practical sessions also.

N. Puneeth
Signature of the Participant



SAMPLE PROJECT HANDOUTS SUBMITTED BY THE PARTICIPANT(S)

Case Study On Solar Roof Top System

Submitted to
" Electrical Systems Design & Green Power Quality Centre "

Sree Vidyanikethan Engineering College (Autonomous)
A-Rangeempet, Tirupati

on hours Certified " " Quality Assurance on
SOLAR PV POWER & INFRASTRUCTURE SOLUTIONS
' 11th to 13th Feb' 2019 '

By
N. Panoeth Kumar
16BF1A0260
3rd B.Tech, EEE
S.V. College of Engineering
Tirupati.
Phno: 9505996986
mailId: nana.panoethkumar@svce.ac.in

Account
F-34
B.S.D & GP-12

total load = 4371.25 W
= 4.4 KW

total load = 10.56775 KW
KW

Layout of House:-

Total Roof Top Area Available = 39.1 M²
(or)
420 Sq. FT

SNO	Equipment	Wattage	Usage	units in kWh
1	Washing M/C	320W	50min	0.275
2	Refrigerator	-	-	0.6741
3	T.V	115W	6 hrs	0.69
4	Elec. Cooktop	660W	2 hrs	1.32
5	Mixer	550W	20 min	0.184
6	Fans (2)	50W	(16+9)	1.25
7	LED Lamps(5)	24W	(6+2+1)	0.216
8	T.F.L (2)	40W	(6+9)	0.6
9	Air Conditioner	1134W	5-6 hrs	6.237
	Total	3041W	-	11.4461 kWh

The kWh per day is 11.4 kWh and rounded to 12 kWh

Watt peak Required = $\frac{\text{Total kWh per day}}{5.5}$

$$= \frac{12}{5.5}$$

$$= 2.181 \text{ kW}$$

$$= 2181 \text{ W}$$

No of panels Required = $\frac{\text{Total Watt Peak}}{\text{Watt Peak Per Panel}}$

$$= \frac{2181}{250}$$

$$= 8.7 \text{ rounded to 9 Panels.}$$

→ Here the Panels are considered has following specifications

Watt peak (P_{mp}) = 250W
 maximum power voltage (V_{mp}) = 30.1V
 maximum power current (I_{mp}) = 8.31A
 Dimensions:- 1640x990x50

Solar charge Controller:-
 The main objective is to provide a constant supply to inverter and battery.

$$P = VI$$

$$I = \frac{2500}{48}$$

$$= 52.08 \text{ A}$$

52.08 A is increased by 25% i.e 65.104
 current is rounded to 70 Amps.

Solar charge controller is 70Amps, 48V MPPT controller.

Inverter:-
 we have 2.5kW load hence we require 2.5kWp inverter i.e 2.5kVA 1-φ with 48V.



Batteries:-

The voltage level of Battery is 48 volts.

$$\text{Amphour rating} = \frac{12 \times 0.85 \times 1000}{48 \times 1}$$

$$= 212.5 \text{ AH}$$

It is rounded to 220 AH.

We require a 48V, 220 AH Battery

(or)
4 12V volts with 220 AH Rating.

Connections of Panels:-

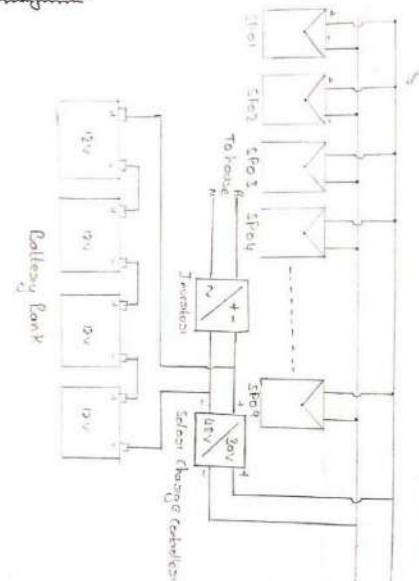
As we use solar charge controller to condition the voltage from 30V to 48V we can connect all the panels in parallel to obtain high currents.

Area of each panel is 1.62 sqm

Total area required = 14.58 sq-m

Total available area = 39.1 sq-m

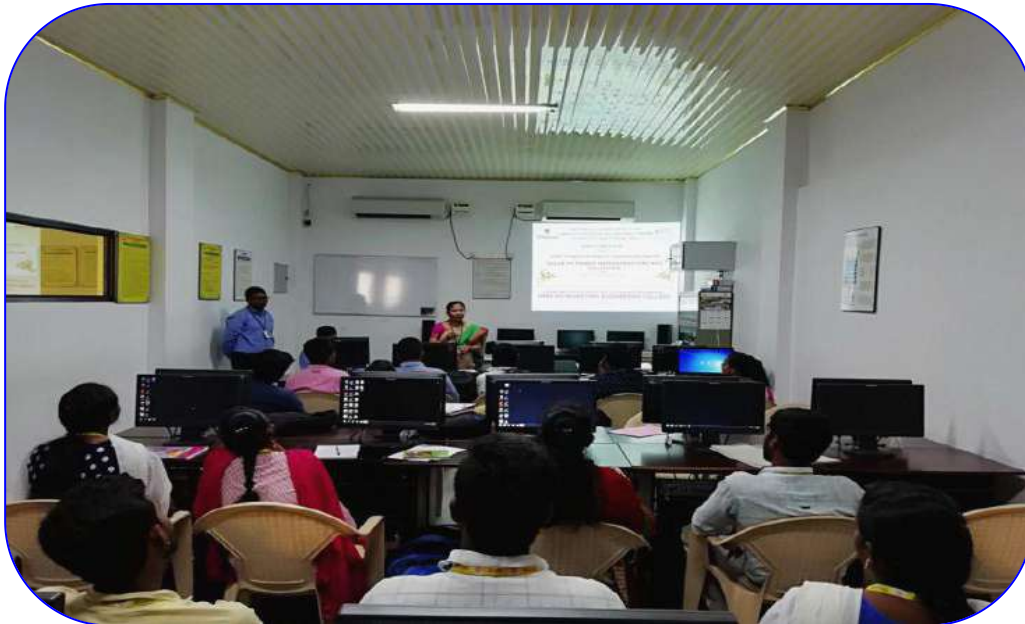
Schematic diagram:-



Continue by?
Module Capacity?

PHOTO GALLERY

WELCOME NOTE



Dr. M. S. Sujatha, Professor & HOD, Dept. of EEE Welcoming the Participants



Dr. S. Hemachandra, Professor & Dean, Industry Relations, addressing the participants

PARTICIPANTS



PARTICIPANTS UNDERGOING PREREQUISITE TRAINING TEST



CLASS ROOM TRAINING SESSIONS

By Prof. D. Jagadeesh



By Prof. K. Leleedhar Rao



PRACTICAL DEMONSTRATIONS



SITE VISIT: 500 kWp ROOF TOP SOLAR POWER PLANT AT SVEC, A. RANGAMPET



INTERACTION SESSION



Dr. T. Nageswara Prasad, Professor & Chairman BoS; Dr. S. Hemachandra, Professor & Dean, Industry Relations interacting with the participants

AWARDING CERTIFICATES TO TRAINEES





CERTIFIED TRAINEES: GP BATCH-01, FEBRUARY, 2019



Certified Trainees with
Dean Industry Relations, Chairman BoS, HOD- EEE, and Trainers