

Tezpur University in association with Assam Energy Development Agency (AEDA) is conducting a residential skill development training program 'Suryamitra' for solar technicians. The program is fully sponsored by Ministry of New and Renewable Energy (MNRE) and will be free of cost for the selected trainees. The Skill Development Program is intended to provide skill to trainees in the field of Solar Photovoltaic Systems installation and service provider.

1. Duration of the Program

The duration of the Suryamitra Skill Development Program will be three months consisting of six hundred hours including hundred hours of soft and entrepreneurship skills.

2. Selection of Participants

For selection of participants to Suryamitra Skill Development Program the candidate should be 10th or 12th pass along with ITI or diploma in any branches of Electrical/Mechanical/Electronics. Experience in certified electrician will be preferred. Candidates with higher qualification will not be considered.

- The selection of the trainee will be based on the academic track record and relevant field experience.
- Special emphasis will be given to the applicants from rural background, unemployed, women candidates, SC/ST candidates.

3. Number of Seats

There shall be 30 seats in this training program.

4. Application procedure

Interested candidate may apply in the prescribed application format available in the Tezpur University Website. Applicants need to submit the copies of academic and experience certificates and mark-sheet along with the application form. The application and the relevant document may be sent to the email address: nabin@tezu.ernet.in and hard copies of the application and relevant documents to the address: Dr Nabin Sarmah, Department of Energy, Tezpur University, P.O. Napaam, Dist. Sonitpur, PIN 784028, Assam. The last date for acceptance of the application form is 10th March 2016. The subject of the email or the subscript of the envelope containing the application should clearly mention 'Application for Suryamitra Program'. For further queries please contact: Dr. Nabin Sarmah (nabin@tezu.ernet.in, Ph: 03712-275314) or Prof. D. C. Baruah (baruahd@tezu.ernet.in, Ph: 03712-2755307).

Report on
Suryamitra Skill Development Program

Conducted by
Tezpur University

In association with
Assam Energy Development Agency (AEDA)
&
National Institute of Solar Energy (NISE)

Sponsored by
Ministry of New and Renewable Energy (MNRE)
Government of India

Prof. Debendra Chandra Baruah
Sadhan Mahapatra
Dr. Nabin Sarmah

Joint-Coordinators
Suryamitra Skill Development Program
Tezpur University

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Department of Energy
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Acknowledgement

The coordinator would like to offer the deep sense of gratitude to National Institute of Solar Energy (NISE) and Assam Energy Development Agency (AEDA) for providing the opportunity to work together for Suryamitra Skill Development Program. Special thanks to Dr Arup Misra, Director, AEDA; Mrinal Krishna Chaudhury, Additional Director AEDA; Dr. O. S. Sastry, Director General, NISE; Deepak Mathur, Pooja Sharma, Ramesh Gera, Nodal Officers for Suryamitra Skill Development Program at NISE for support and cooperation in every aspect for successful completion of the program at Tezpur University.

The coordinators are extremely grateful to the honourable Vice-Chancellor of Tezpur University Prof. Mihir Kanti Chaudhuri for his all-round support in organising the Suryamitra Skill Development Program at Tezpur University. The coordinators are greatly in debt to Dr Biren Das, Registrar, Tezpur University for his suggestions, support and cooperation. Dr Das provided all-round support to make this program successful in Tezpur University. Thanks go to the Head, Department of Energy for providing the logistic support. Without his consent and support it would be very difficult in organising the program. Coordinators also appreciate the continuous support of the faculty, staff and student of Department of Energy.

Coordinators acknowledge the support from Dean, Student Welfare, Tezpur University and his office for providing the accommodating of the participants in different hostels of the University.

Thanks extend to all the Department co-ordinators, Dr Partha Pratim Dutta, Dr Munish Manas, Debraj Bailung Sonowal and other faculties of Tezpur University who contributed as trainers in the different areas of the course curriculum.

We are very thankful to the guest trainers, Sanjeev Sarma, Fazle Illahi and Madhurjya Deka and Harekrishna Baruah for their contribution in this program.

We also wish to express my gratitude to the other stakeholder of the program including the utilities for food and accommodation and other administrative issues. At the end coordinators would like to thank all regular M.Tech and PhD students of Department of Energy, Tezpur University for their support and whenever required.

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1. Background

The government of India has a target to install 100 GW of solar power by 2022. To fulfil the targeted capacity and for effective operation and maintenance there will be a need of skilled man power in the field of solar energy. However there is lack of proper infrastructure, target based curriculum, lack of certification, deficiency of aspiration and motivation. To overcome these hurdles, Prime Minister Office initiated a dream project “Skilling India” for unemployed youths of India with a target to generate 500 million skilled man powers in different target sectors. Renewable Energy is one of the target areas with big emphasis on solar energy and in particular solar photovoltaics.

The Ministry of New Renewable Energy, Government of India has taken an initiative to installed 100 GW solar project by 2022 in co-ordination with State Nodal Agencies. However, there are gaps in the capacity and quality of training infrastructure as well as outputs, insufficient focus on workforce aspirations, lack of certification and common standards and a pointed lack of focus on the unorganized sector. In order to achieve this mission more than 50,000 skilled manpower are required for installation, commissioning, operation and maintenance in the field of solar energy. National Institute of Solar Energy (an autonomous institute under the Ministry of New & Renewable Energy) has been given the responsibility to organise the various skill development programmes in solar photovoltaics in association with state nodal agencies throughout the country. National Institute of Solar Energy (NISE) started the skilled development program in the area of photovoltaics with a program name called “Suryamitra Skill Development Program”. NISE in association with state nodal agencies has selected numbers of training centres in the country to conduct the program based on the expression of interest submitted by those institutes or organisations. The institutes or organisations are selected based on the facility and infrastructure available for conduct a quality skill development program of 90 days.

2. Genesis of Suryamitra Skilled Development Program in Tezpur University

As per the background of skill development program Tezpur University submitted the expression of interest to be a training institute for Suryamitra Skill Development Program on 28th October 2015. The program is coordinated by three interested faculty members Prof. Debendra Chandra Baruah, Sadhan Mahapatra and Dr. Nabin Sarmah. The University administration and coordinator was informed about the selection of Tezpur University as


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training centre through a letter dated 23rd November 2015. With the selection as training Institute for Suryamitra Skill Development Program, coordinator started the initiative and it was decided to start the program by March 2016. A notice about program was published on 'The Assam Tribune' and 'Amar Asom' on 25th January 2016, with detailed advertisement at the Tezpur University website along with the application form. A decent number of responses were received with application, so a second round advertisement was floated as scrolled display for 2 days in a regional news channel DY-365. The number of application increased and it was decided to start the program from 1st April 2016. Meantime Circulation for State Assembly Election of Assam was announced and the process to start the program delayed; so a final date of 2nd May 2016 was agreed. The final list of the selected participants was uploaded in the Tezpur University website and informed all the selected participants over telephone.

3. The Program Implementation Strategy in Tezpur University

Since the Suryamitra program has a curriculum which needs expertise in different domains such as electrical engineering, electronics engineering, mechanical engineering, civil engineering, it was decided to form a committee having faculty coordinators from different Departments for smooth conduction of the program. With the approval of Vice-chancellor and agreed by the Heads of the different Departments, few faculty members and technical staffs of various engineering departments are requested to take theory and laboratory classes.

The accommodations for the participants were arranged in the different hostels of Tezpur University separately for boys and girls. Similarly the foods for the participants were arranged in the utility facility available in the University campus. A good quality food with a dynamic menu was agreed with the service provider.

4. Execution of the Program in Tezpur University

The numbers of participants registered for the program on 1st May 2016 are 37. The participants were provided a file cover, note books, pen and study material based on the curriculum, which were found suitable for the program. A class schedule is prepared to accommodate the classes of the Suryamitra program uninterrupted without affecting the normal theory and laboratory class schedule of the other courses. While preparing the class schedule the guideline for the Suryamitra curriculum was thoroughly followed. As per the guideline more emphasis was given to the laboratory/practical classes and the participants

were provided ample time and opportunity to work with the practical/laboratory set-ups. The participants spent 600 working hours in the program in which approximately 480 hrs were guided work (theory and experiment) and rest 120 hours were spent by the participants to carry out various assignments and report preparation during evening hours (in computer laboratory) and weekend. The participants were encouraged to carry out assignments during weekend instead of spending leisurely hours.

As per the schedule theory classes of the different domains were taken by the experts of the Departments and practical/laboratory classes were done in the respective Departmental laboratories guided by the technical staff of the Department. The faculty members of Tezpur University involved in the theory classes is given in Appendix – III.

During the program three guest trainers were invited to take classes on the different aspects of PV system and components:


- i. Mr. Rama Siva (CEO, AnthroPower, New Delhi)
- ii. Mr. Sanjeev Sarma (Entrepreneur, Electro Sales, Guwahati)
- iii. Mr Fazle Illahi (DGM, Eastern Envo Projects)
- iv. Mr Madhurjya Baruah (Engineer, Jain Irrigation Systems Pvt Ltd)

On a very rare opportunity Prof. H Patangia from University of Arkansas – Little Rock, USA took a class on the electronics component of PV system. Prof Patangia was visiting Tezpur University during that time, so on the request of the coordinators, he agreed to have a interaction and discussion with the participants on that topic.

During the program the participants carried out 19 experiments as given in the curriculum guideline document of Suryamitra program. There were three field trips organised during the program:

- i. 33kV power sub-station of Tezpur University
- ii. 15 kW_p PV roof installation in Hazarapar, Tezpur
- iii. 3 kW_p PV installation on fuel station, Thelamara

Moreover, numbers of assignments were carried out by the participants in the area of standalone street light PV system design and installation, maintenance of the PV systems (1kW PV system in the Department of Energy and existing solar street light system of Tezpur


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University). Furthermore, detail component pricing analysis and component search in the internet was also guided to the participants. It is expected that the field trip, experiments and assignments have a strong understanding and exposure on the PV system to the participants. The Suryamitra Skill Development program in Tezpur University completed on 30th of July and 30 successful participants of the first batch were awarded certificate in a valedictory function.

5. Assessment and Certification

The assessment of the participants of the program was carried out on 29th July 2016. The assessment was done with a set of question papers (Part-I and Part-II), which includes objective type, descriptive type and numerical questions. The questions were set by the trainers (both in-house and guest trainers) which was compiled in two parts for convenience. A laboratory note book from all the participants were asked to submit in which theory and experiments are described with the results and discussion. A quiz on the laboratory experiments was arranged for evaluation based on the experiment performed. To assess the soft skill of the participants a session on the presentation on topic of interest was carried out. Based on these parameters the assessment of the participants of the Suryamitra Skill Development Program was carried out.

The successful participants on these assessments were issued a certificate signed by the Director of AEDA (State Nodal Agency coordinating the Suryamitra Program with NISE) and joint coordinator of the Suryamitra Skill Development Program in Tezpur University.

6. The valedictory Function

The valedictory function organised to distribute the certificate to the Suryamitras. The function was graced by Director, Assam Science Technology and Environment Council (ASTEC) and Assam Energy Development Agency (AEDA) Dr. Arup Misra; Additional director AEDA, Mr. Mrinal Chaudhury; Registrar of Tezpur University Dr. Biren Das; Entrepreneur Mr Sanjeev Sarma. The program started with felicitation of invited guests. To begin with, Joint coordinator of the program Professor Debendra Chandra Baruah welcomed all the invited guests and participants to the function and mentioned genesis of the program in Tezpur University. He also mentioned the contributions that higher education institutes can play in this type of skill development programs. The chief guest Dr Arup Misra congratulated all the Suryamitras on successful completion of the program. He mentioned that with

government of initiatives with campaigns like 'Make in India' there will be a huge demand of skilled persons in different technical requirements. He also mentioned that Suryamitras are going to play a big role in the ambitious project of Government of India in generation 100 gigawatts of power from solar photovoltaics. Mr Mrinal Krishna Chaudhury also mentioned the opportunities of Suryamitra in current energy demand scenario and highlighted some successful employment of other suryamitras in different corporate sectors and becoming entrepreneur. Dr. Biren Das congratulated all the successful participants and acknowledged the contribution and hard of all the stakeholders in smooth conduction of the program in Tezpur University. Mr Sanjeeb Sarma in his speech mentioned that the Suryamitras should target to be an entrepreneur, where they can provide employment to others. He also promised all round support to the suryamitras to start business or for employment. In the speech from the participants, three participants Dhruva Krishna Deka, Arifa Sidikki Ahmed and Dipankar Neog expressed their thoughts and comments about the program and the learnings. They mentioned that the program was useful to them and they have gained motivation and confidence both in technical and entrepreneurship aspects in the area of solar photovoltaics.

Towards the end of the function, joint coordinator Dr Nabin Sarmah offered the vote of thanks. He acknowledged the support and co-operation from Tezpur University fraternity; AEDA; NISE and other stakeholders. He also congratulated and thanked the participants for being part of such a visionary program from government of India. The program ended with thanks to the invited guest and all the audience present in the function. A group photo of the Suryamitras was taken along with the invited guests and coordinators.

An informal interaction of Suryamitras was organised with the Director and Additional director of AEDA after the valedictory function, where different aspects and future prospects of the Suryamitras were discussed.

7. Conclusions

The Suryamitra Skill Development Program conducted at Tezpur University is successfully completed with all round benefit of the successful participants. There is no doubt that higher education can play a big role in this kind of skill development program because of quality manpower and infrastructure available.


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Tezpur University


Mrinal Krishna Chaudhury

Biren Das


It is to be mentioned that in some aspects is not convenient to entirely follow the guidelines of the Suryaimtra Skill Development program prepared by NISE. In one of such cases total working hours to be given range to complete the course curriculum. Since the numbers of days of the program to be fixed (considering the accommodation and utility expenditures) and vacation or holidays on between causes difficulty in fulling the total 600 working hours given in the guidelines within 90 days; specially for central government organisation where there is policy of 5 working days in a week.

In another note, the internship arrangement (session 16) for the Suryaimtra participants should be provided by the State Nodal Agency and NISE in partner with industry/project site. It may not be easy for training institute to arrange internship for the participants in industry/project site, if there no such facility available locally.

It is expected that the Suryaimtra Skill Development Program can generate skilled man power that can fulfil the demand of solar technicians in achieving the dream of 100GW power generation from solar energy.


Prof. D. C. Baruah
Head
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Sadhan Mahapatra


Dr. Nabin Sarmah

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Email: nabin@tezu.ernet.in

Annexure – I
List of the Participants

Sl No	Name	Address	Phone Number	Email
1	Birinchi Kumar Gogoi	Morangaon; Jorhat	8752058109	birinchigogoi2@gmail.com
2	Rajendra Chauhan	Pub-Silputa; Karbi-Anglong	8876618229	-
3	Homen Chandra Ray	Nidani; Bahalpur; Dhubri	9864342649	homenroy@gmail.com
4	Anirban Baruah	Barangabari; Darrang	9678998504	angshuman.ani@gmail.com
5	Rituparna Baruah	Chowtang; Jorhat	9613428144	talk2rituparna@gmail.com
6	Dhruba Krishna Deka	Bamunimaidan; Guwahati	8812011973	Dhruba.K.Deka@gmail.com
7	Dipankar Neog	Dahotia; Jorhat	8403959579	dipankarneog018@gmail.com
8	Abhijit Borah	Panichakua; Jorhat	7576887320	Abhijitborah123456@gmail.com
9	Lakhyan Bauri	Mazgaon; Tezpur	8399974685	-
10	Kartik Goswami	Sarthebari; Barpeta	8876062125	kartikgoswami0361@gmail.com
11	Arup Kumar Sarkar	Sarupata; Barpeta	9707680226	arupkumarsarkar12@gmail.com
12	Arifa Siddika Ahmed	Katanilgaon; Nagaon	9613139046	-
13	Giridhary Ray	Geetanagar; Abhayapuri	9954052196	-
14	Jahidul Hossain	Barundanga; Dhubri	9954888792	alom.mehbub@gmail.com
15	Lakhi Bhakta	Nizarapara; Chapakhowa (Sadiya)	8723082753	Sikor.dib@gmail.com
16	Pallabi Sonowal	Niz Mancotta Gaon; Dibrugarh	7576863991	chandanchetia16@gmail.com
17	Nirmal Kr Daimari	Samaguri; Nagaon	8011029002	-
18	Debajit Chetia	Nangalamora; Sivasagar	9954219738	-
19	Sasthendra K Nath	Barbhagia; Morigaon	9613664412	-
20	Mitharam Handique	Patia Chuburi; Dekargaon	9854232799	mitharam@tezu.ernet.in
21	Navanit Kumar Roy	Nagakhelia; Dhemaji	9954368984	navanit@tezu.ernet.in
22	Bhaskar Baruah	Amtala Gaon; Nagaon	9706270137	bhaskar.baruah57@gmail.com
23	Hirak Jyoti Haloi	Patia Chuburi, Dekargaon	9508793014	munti143@gmail.com
24	Jayanta Upadhayaya	Chandmari; Tezpur	8752043409	jayantaupadhayaya@gmail.com
25	Iseng Thawmung	Silonijan; Karbi Anglong	9613861467	Iseng05022@gmail.com
26	Pranjal Borah	Kalyanpur; Biswanath Chariali	9706693094	pranjalagni@gmail.com
27	Nava Kumar Gogoi	Dhakuwakhana; Lakhimpur	9854014672	nkgogoi07@gmail.com
28	Satya Prasad Saikia	Morongi; Golaghat	9864362178	satyap@tezu.ernet.in
29	Gunakanta Borah	Haleswar, Tezpur	9435080409	pinkutez80@gmail.com
30	Tapanjit Borah	Niz Kadamoni, Dibrugarh,	9435084210	tapanjitbora@yahoo.com

Annexure – II

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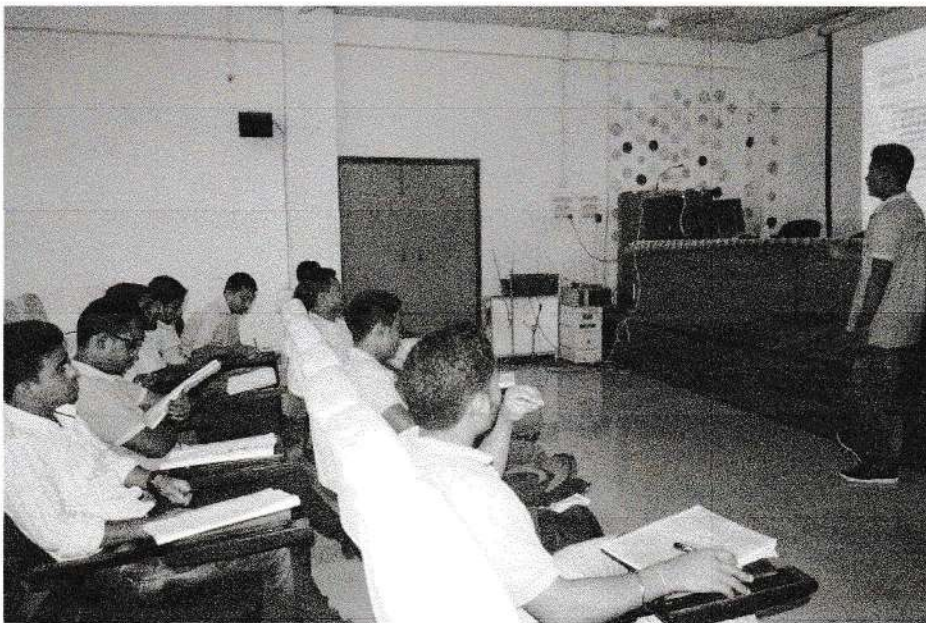
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Photographs of various activities and moments



Photograph-1: Photograph of a theory class



Photograph-2: Student participation in class and presentation

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Tezpur University

J. Mukherjee

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Photograph-3: Laboratory class



Photograph-4: Experiment on PV system design

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Photograph-5: Invited guests of valedictory function



Photograph-6: Certificate distribution to the Suryamitras

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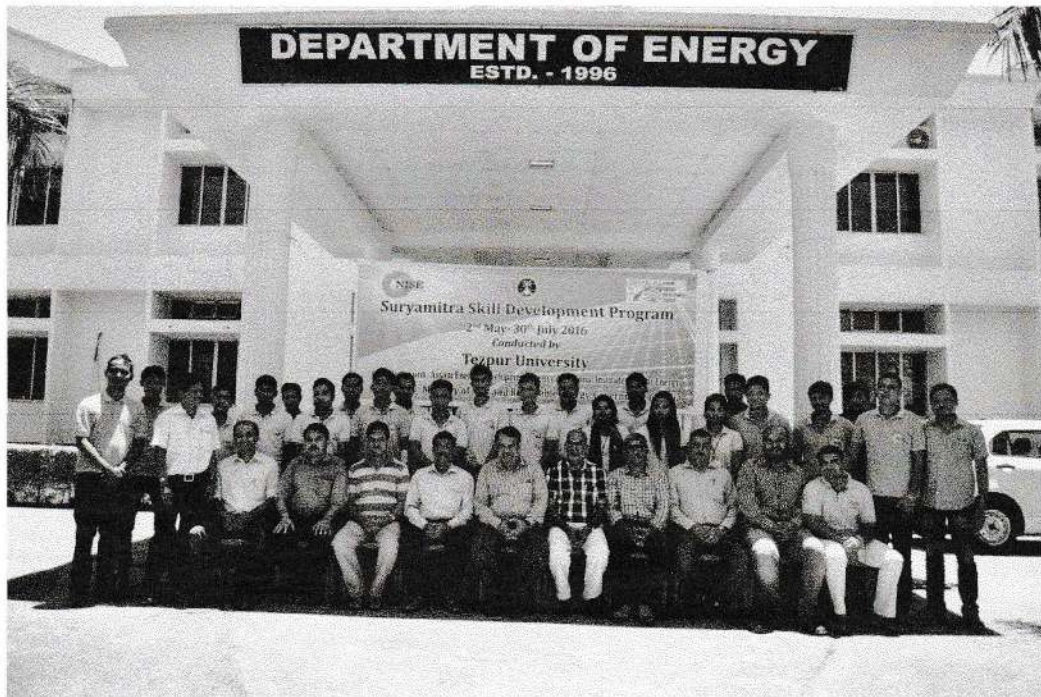
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Photograph-7: Part of the audience in valedictory function



Photograph-8: Group photo of invited guest of Valedictory function and Suryamitras

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Annexure – III

List of the Internal and Guest Experts contributed

Table – 1: Internal Experts of Tezpur University contributed in Suryamitra Skill Development Program

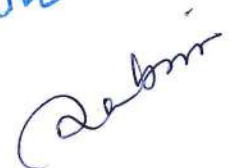
Internal Experts of Tezpur University			
SI No	Name	Designation	Department
1	Dr. Munish Manas	Assistant Professor	Electronics and Communication Engineering
2	Mr. Barnam Saharia	Assistant Professor	Electronics and Communication Engineering
3	Dr. Partha Pratim Dutta	Associate Professor	Mechanical Engineering
4	Mr Debraj Bailung Sonowal	Assistant Professor	Civil Engineering
5	Abhisek Das	Assistant Professor	Civil Engineering
6	Dr. Tridip Ranjan Sarma	Associate Professor	Business Administration
7	Dr Biraj Kumar Kakati	Assistant Professor	Energy
8	Prof Debendra Chandra Baruah	Professor	Energy
9	Sadhan Mahapatra	Assistant Professor	Energy
10	Dr. Nabin sarmah	Assistant Professor	Energy

Table – 2: External Experts contributed in Suryamitra Skill Development Program in Tezpur University

Internal Experts			
SI No	Name	Designation	Institute/Organisation
1	Mr. Rama Siva	CEO	AnthroPower
2	Mr. Sanjeev Sarma	Entrepreneur	Electro Sales, Guwahati
3	Mr Fazle Illahi	DGM	Tezpur University
4	Mr Madhurjya Baruah	Engineer; Solar Division	Jain Irrigation Systems Pvt Ltd
5	Prof. Hirak Patangia	Professor	University of Arkansas – Little Rock, USA


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Annexure - IV
Class Time Schedule
Suryanitra Skill Development Program
Tezpur University

Day	Time	9:00 – 10:00	10:00 – 11:00	11:00 – 12:00	12:00 – 1:00	1:00 – 2:00	2:00 – 3:00	3:00 – 4:00	4:00 – 5:00	5:00 – 6:00	
02/05/16 (Monday)		Introduction to PV and System Installation (Rama Siva; Guest Trainer)				Break	Practical for PV System Installation (Rama Siva; Guest Trainer)				
03/05/16 (Tuesday)	Introduction to PV and System Installation (Rama Siva; Guest Trainer)				Practical for PV System Installation (Rama Siva; Guest Trainer)						
04/05/16 (Wednesday)	Introduction to PV and System Installation (Rama Siva; Guest Trainer)				Practical for PV System Installation (Rama Siva; Guest Trainer)						
05/05/16 (Thursday)	Introduction to PV and System Installation (Rama Siva; Guest Trainer)										
06/05/16 (Friday)	General Orientation	Orientation DGB	Orientation BKK	Orientation SM	Practical for PV System Installation (Rama Siva; Guest Trainer)						
09/05/16 (Monday)	Introduction to Electricity (MM)	Demo on Voltage Current Resistance (Energy Department Laboratory) TB				Break	Demo on Voltmeter Ammeter (Electrical Engineering Lab) MM/Electrical Technical Assistant				
10/05/16 (Tuesday)	Briefing on Electrical and Mechanical Tool (MM)	Demo on Mechanical Tool (Central Workshop) PPD					Demo on Electrical Tool (Electrical Engineering Lab) MM/Electrical Technical Assistant				
11/05/16 (Wednesday)	Briefing on Fuse and Soldering (MM)	Demo on Soldering (Energy Laboratory) TB					Demo on Fuses (Electrical Engineering Lab) MM/Electrical Technical Assistant				
12/05/16 (Thursday)	Briefing on various wires and cables (MM)	Demo on wires and cables (Electrical Engineering Lab) MM/Electrical Technical Assistant				Break	Demo on wires and cables (Electrical Engineering Lab) MM/Electrical Technical Assistant				
13/05/16 (Friday)	Briefing on Resistance and Ohm Law (MM)	Demo on Resistances and Rheostat (Electrical Engineering Lab) MM/Electrical Technical Assistant					Demo on Resistances and Rheostat (Electrical Engineering Lab) MM/Electrical Technical Assistant				

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Department of Energy

Signature

Signature

Class Time Schedule
Suryamitra Skill Development Program
Tezpur University

Day	Time	9:00 – 10:00	10:00 – 11:00	11:00 – 12:00	12:00 – 1:00	1:00 – 2:00	2:00 – 3:00	3:00 – 4:00	4:00 – 5:00	5:00 – 6:00
16/05/16 (Monday)	Briefing on Alternating current (MM)	Lab visit for AC power (Electrical Engineering Lab) MM/ Electrical Technical Assistant					Demo on AC (Electrical Engineering Lab) MM/ Electrical Technical Assistant		Exercise on AC (Energy Laboratory) TB	
17/05/16 (Tuesday)	Briefing on Generation/Transmission and Distribution of electricity (MM)	Lab visit for AC power (Electrical Engineering Lab) MM/ Electrical Technical Assistant								
18/05/16 (Wednesday)	Introduction to Renewable Energy (SM)	Introduction to Solar Energy (DCB)		Lab Visit (Energy Lab) TB			Tezpur University Sub-Station visit for AC power MM/TB/NS			
19/05/16 (Thursday)	Introduction of Photovoltaic Technology (SM)	Lab Visit of Solar Lights (TB)								
20/05/16 (Friday)	Briefing on Photovoltaic Applications (NS)	Demonstration of PV System (TB)								
23/05/16 (Monday)	Laboratory Exercises on PV system (TB)									
24/05/16 (Tuesday)	Laboratory Exercises on PV system (TB)									
25/05/16 (Wednesday)	Laboratory Exercises on PV system (TB)									
26/05/16 (Thursday)	Briefing on Components of a PV System (MM)	Lab Visit for DC-DC Inverter and DC-AC Inverter (MM/ Electrical Technical Assistant)								
27/05/16 (Friday)	Experiment Solar Street Light System (TB)									
28/05/16 (Saturday)	Project Work and Report Writing									

Class Time Schedule
Suryamitra Skill Development Program
Tezpur University

Day	Time	9:00 – 10:00	10:00 – 11:00	11:00 – 12:00	12:00 – 1:00	1:00 – 2:00	2:00 – 3:00	3:00 – 4:00	4:00 – 5:00	5:00 – 6:00
30/05/16 (Monday)	Introduction to Battery, Types, Operation and Structure (BKK)	Experiments with Batteries: VI characteristics, Series/Parallel Connections (TB)				Hand on Experiments on Charging and Discharging of Batteries (TB)				
31/05/16 (Tuesday)	Basics of Stand Alone PV System; BOS(SM)	Identification of different BOS components in 1kW PV system (TB)		Demonstration of the Inverters (Electrical Engineering Lab) (MM/ Electrical Technical Assistant)		Experiment No#6 Hand on Experiments on Charging and Discharging of Batteries (TB)				
01/06/16 (Wednesday)	Introduction to Inverter: Types, Operation, Specification (MM)	Demonstration of the Inverters (Electrical Engineering Lab) (MM/ Electrical Technical Assistant)		Demonstration of Charge Controller (TB)		Experiment No#7 Effect of variation on tilt angle on PV module power (TB)				
02/06/16 (Thursday)	Basics of Charge Controller: Operation and Specifications (MM)	Demonstration of Charge Controller (TB)		Video demonstration of Grid connected SPV System (HP/SM/TB)		Hand on Practice with inverters – Waveform of Inverter (Electrical Engineering Lab) (MM/ Electrical Technical Assistant)				
03/06/16 (Friday)	Grid Connection of SPV System (HP)	Estimate the load in the Department of Energy (TB)		Site Survey in the TU campus to figure out suitable location for 1MW PV system (TB)		Hand on practice of Charge controller in Solar Street Light System				
06/06/16 (Monday)	Energy Efficiency and Choice of Components in designing PV system (SM)	Site Survey in the TU campus to figure out suitable location for 1MW PV system (TB)		Video tutorial on Layout aspects and Module sizing (NS/TB)		Experiment No#8: Power from standalone PV system with AC load and battery (In 1kW system) (TB)				
07/06/16 (Tuesday)	Load estimation, Site Survey and assessment (Shading, geographic analysis) (SM)	Video tutorial on Layout aspects and Module sizing (NS/TB)		Task: List out components required for 1MW Grid connected PV system (TB)		Energy auditing and suggestions to increase energy efficiency in the Department of Energy; TU (TB/BG)				
08/06/16 (Wednesday)	Module sizing aspects, Layout (NS)	Selection of Batteries/Inverters (SM)		Cost analysis of the SPV project (NS/TB)		Site Survey in the TU campus to figure out suitable location for 1MW PV system (Prepare and submit report by end of the day) (TB)				
09/06/16 (Thursday)	Selection of Modules based on market specifications (NS)	Task: List out components required for 1MW SPV System (Online/Tezpur Market) (TB)		Cost analysis of the SPV project (TB)		Experiment No#9: Power from standalone PV system with DC load and battery (In 1kW system) (TB)				
10/06/16 (Friday)	Understanding the cost involved in the SPV project (SM)	Project Work and Report Writing		Project Work and Report Writing		Market survey (Price, specifications, availability) of the different components for 1 MW SPV System (Online/Tezpur Market) (TB)				
11/06/16 (Saturday)	Project Work and Report Writing									

Class Time Schedule
Suryamitra Skill Development Program
Tezpur University

Day	Time	9:00 – 10:00	10:00 – 11:00	11:00 – 12:00	12:00 – 1:00	1:00 – 2:00	2:00 – 3:00	3:00 – 4:00	4:00 – 5:00	5:00 – 6:00
13/06/16 (Monday)		Instruments for PV performance monitoring (NS)	Experiment No#11: Electrical Measuring Equipment (TB)				Experiment No#11: Electrical Measuring Equipment (TB)		Write Report on Experiment No#11	
14/06/16 (Tuesday)		Identification of defect in PV module (SM)	Experiment No#13: Shading effect of a PV Panel (TB)				Experiment No#13: Shading effect of a PV Panel (TB)		Write report on Experiment#13	
15/06/16 (Wednesday)		Troubleshooting of defects in PV module (NS)	Get IV data of Different PV modules; Get radiation data (TB)				Analyse the IV data and interpret defects for troubleshooting (NS/TB)		Write report on Analysing IV data	
16/06/16 (Thursday)		Introduction to battery maintenance (BKK)	Experiment No#15: Battery Characteristics (TB)				Experiment No#15: Battery Characteristics (TB)		Write report on Experiment No#15	
17/06/16 (Friday)		Quality assessment of charge controllers and inverters (BS)	Experiment No#16: MPP and PWM charge controller characteristics (BS/TB)				Experiment No#16: MPP and PWM charge controller characteristics (BS/TB)		Write report on Experiment#16	
20/06/16 (Monday)		Introduction to various tools for PV power plant installation (PPD)	Demonstration of different tools for PV power plant installation (PPD/Mechanical Workshop Assistant)				Demonstration of different tools for PV power plant installation (PPD/Mechanical Workshop Assistant)		Write report on different tools for PV power plant installation	
21/06/16 (Tuesday)		PV System installation check-list preparation; safety handling (DCB)	Visit 1 kW system and understand the safety requirement (TB)				Visit 1 kW system and understand the safety requirement (TB)		Write report on safety requirement and Qualitative/quantitative assessment	
22/06/16 (Wednesday)		Introduction to civil foundation, erection, supporting structures (AD)	Demonstration on civil foundation, erection, supporting structures and grounding considerations (AD/Technical Assistant)				Hand on experiment in lab for civil foundation, erection, and supporting structures (AD/Technical Assistant)		Write report on civil foundation, support and ground considerations	
23/06/16 (Thursday)		Installation of mechanical structures in PV power plant (AD)	Demonstration on Installation of mechanical structures in PV power plant (AD/Technical Assistant/TB)				Demonstration on Installation of mechanical structures in PV power plant (AD/Technical Assistant)		Write report on Installation of mechanical structures in PV power plant	
24/06/16 (Friday)		Mechanical safety aspects in PV power plant (AD)	Demonstration of Mechanical safety aspects in PV power plant (AD/Technical Assistant)				Hand on practice on Mechanical safety aspects in PV power plant (AD/Technical Assistant)		Write report on Mechanical safety aspects in PV power plant	
25/06/16 (Saturday)		Project Work					Project Work			

Class Time Schedule
Suryamitra Skill Development Program
Tezpur University

Day	Time	9:00 – 10:00	10:00 – 11:00	11:00 – 12:00	12:00 – 1:00	1:00 – 2:00	2:00 – 3:00	3:00 – 4:00	4:00 – 5:00	5:00 – 6:00	
27/06/16 (Monday)	Preparation and general considerations for PV system installation (SM)	Install a PV system with existing facility (TB)				Install a PV system with existing facility (TB)					
28/06/16 (Tuesday)	Installation and Maintenance of PV System (Mr. Sanjeev Sarma: Guest Trainer)	Installation and Maintenance of PV System (Mr. Sanjeev Sarma: Guest Trainer)				Experiment on Installation and Maintenance of PV System (TB)					
29/06/16 (Wednesday)	Installation and Maintenance of PV System (Mr. Sanjeev Sarma: Guest Trainer)	Installation and Maintenance of PV System (Mr. Sanjeev Sarma: Guest Trainer)				Experiment on Installation and Maintenance of PV System (TB)					
30/06/16 (Thursday)	Field trip to Hazarapar, Tezpur (PV rooftop installation)	Field trip to Hazarapar, Tezpur (PV rooftop installation)				Field trip to Thelamara (PV installation on fuel station)					
01/07/16 (Friday)	Quality assessment of charge controllers and inverters (BS)	Experiment No#16: MPPPT and PWM charge controller characteristics (BS/TB)				Experiment No#16: MPPPT and PWM charge controller characteristics (BS/TB)		Write report on Experiment#16			
02/07/16 (Saturday)	Project Work										
04/07/16 (Monday)	General safety consideration in the installation phase of solar power plant (DCB)	Experiment No # 17: Study of Solar DC System (TB)				Experiment No # 17: Study of Solar DC System (TB)		Write report on Experiment No#17			
05/07/16 (Tuesday)	The procedures involved in the commissioning of the power plants (DCB)	Experiment No # 18: Study of Solar Power Conditioning Unit (TB)				Experiment No # 18: Study of Solar Power Conditioning Unit (TB)		Write report on Experiment No#18			
06/07/16 (Wednesday)	Holiday for Id-ul-Fitr (Participants are requested to prepare a presentation of 10 min to be present on 8 th July, Friday)										
07/07/16 (Thursday)	Holiday for Id-ul-Fitr (Participants are requested to prepare a presentation of 10 min to be present on 8 th July, Friday)										
08/07/16 (Friday)	Soft and Entrepreneur Skills: Effective Communication (DCB)	Entrepreneur Skills: Presentation Skills (DCB)	Soft and Entrepreneur Skills: Interpersonal Skill Development (DCB)				Presentation by Participants (5 min each) (DCB)				
09/07/16 (Saturday)	Project Work										

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 Head,
 Department of EEE,
 Tezpur University

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 J. S. Saha

Class Time Schedule
Survamitra Skill Development Program
Tezpur University

Day	Time	9:00 – 10:00	10:00 – 11:00	11:00 – 12:00	12:00 – 1:00	1:00 – 2:00	2:00 – 3:00	3:00 – 4:00	4:00 – 5:00	5:00 – 6:00	
11/07/16 (Monday)		Preparation and general considerations for installation (DC and AC components) (Mr. Fazle Illahi; Guest Trainer)					Experiment and hand on practice for general considerations for installation in 1kW PV System (TB)				
12/07/16 (Tuesday)		Various protocols for operation and maintenance of PV power plant. Brief on various check points for daily maintenance (Mr. Fazle Illahi; Guest Trainer)					Experiment and hand on practice for maintenance of PV power plant. Brief on various check points for daily maintenance (in 1kW PV system) (TB)				
13/07/16 (Wednesday)		Procedures for trouble shooting and repairs during the maintenance. Guidelines to handle emergency situations. Safety practices in work sites. (Mr. Fazle Illahi; Guest Trainer)					Experiment and hand on practice for trouble shooting and repairs during the maintenance with the street light system (Solar Street light at Health Centre) (TB)				
14/07/16 (Thursday)		Entrepreneurship opportunities in solar photovoltaic and Development of Competency for good Entrepreneur (Mr. Fazle Illahi; Guest Trainer)					Practice ford development of Competency for good Entrepreneur (Assignment Presentation) (NS)				
15/07/16 (Friday)		Instruments used for monitoring performance of PV module (NS)					Experiment # 19: Demo on Conversion of Normal Inverter to Solar Inverter (TB)	Write Report on Experiment # 19			
18/07/16 (Monday)		PV System design and sizing for specific site, location and load (Mr. Madhurjya Borah; Guest Trainer)					Experiment on Design a PV system (TB)				
19/07/16 (Tuesday)		Check list preparations and Pre-requirements of installation (Mr. Madhurjya Borah; Guest Trainer)					Experiment on installation of PV System for irrigation (TB)				
20/07/16 (Wednesday)		Installation of Solar Power plant (Mr. Madhurjya Borah; Guest Trainer)					Experiment on Installation aspects of solar Power plant (TB)				
21/07/16 (Thursday)		Business in solar energy and Entrepreneurship opportunities in the area of Solar PV installation (Mr. Madhurjya Borah; Guest Trainer)					Presentation by Participants (5 min each) (Mr. Madhurjya Borah; Guest Trainer)				
22/07/16 (Friday)		Operation and maintenance of PV System: Component and Devices (NS)					Experiment of PV System maintenance (TB)				


 Head
 Department of Energy
 Tezpur University


 Asst. Prof.


Class Time Schedule
Survanitra Skill Development Program
Tezpur University

Day	Time	9:00 – 10:00	10:00 – 11:00	11:00 – 12:00	12:00 – 1:00	1:00 – 2:00	2:00 – 3:00	3:00 – 4:00	4:00 – 5:00	5:00 – 6:00	
11/07/16 (Monday)		Preparation and general considerations for installation (DC and AC components) (Mr. Fazle Illahi; Guest Trainer)					Experiment and hand on practice for general considerations for installation in 1kW PV System (TB)				
12/07/16 (Tuesday)		Various protocols for operation and maintenance of PV power plant. Brief on various check points for daily maintenance (Mr. Fazle Illahi; Guest Trainer)					Experiment and hand on practice for maintenance of PV power plant. Brief on various check points for daily maintenance (in 1kW PV system) (TB)				
13/07/16 (Wednesday)		Procedures for trouble shooting and repairs during the maintenance. Guidelines to handle emergency situations. Safety practices in work sites. (Mr. Fazle Illahi; Guest Trainer)					Experiment and hand on practice for trouble shooting and repairs during the maintenance with the street light system (Solar Street light at Health Centre) (TB)				
14/07/16 (Thursday)		Entrepreneurship opportunities in solar photovoltaic and Development of Competency for good Entrepreneur (Mr. Fazle Illahi; Guest Trainer)					Practice for development of Competency for good Entrepreneur (Assignment Presentation) (NS)				
15/07/16 (Friday)		Instruments used for monitoring performance of PV module (NS)					Experiment # 19: Demo on Conversion of Normal Inverter to Solar Inverter (TB)	Write Report on Experiment # 19			
18/07/16 (Monday)		PV System design and sizing for specific site, location and load (Mr. Madhurjya Borah; Guest Trainer)					Experiment on Design a PV system (TB)				
19/07/16 (Tuesday)		Check list preparations and Pre-requirements of installation (Mr. Madhurjya Borah; Guest Trainer)					Experiment on installation of PV System for irrigation (TB)				
20/07/16 (Wednesday)		Installation of Solar Power plant (Mr. Madhurjya Borah; Guest Trainer)					Experiment on Installation aspects of solar Power plant (TB)				
21/07/16 (Thursday)		Business in solar energy and Entrepreneurship opportunities in the area of Solar PV installation (Mr. Madhurjya Borah; Guest Trainer)					Presentation by Participants (5 min each) (Mr. Madhurjya Borah; Guest Trainer)				
22/07/16 (Friday)		Operation and maintenance of PV System: Component and Devices (NS)					Experiment of PV System maintenance (TB)				

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Annexure – V

Program Schedule of Valedictory function



Suryamitra Skill Development Program

(Conducted by Tezpur University in association with Assam Energy Development Agency (AEDA) and National Institute of Solar Energy (NISE) and sponsored by Ministry of New and Renewable Energy, Government of India)

Valedictory Function Schedule

Saturday, 30th July, 2016

Venue: Seminar Hall; Department of Energy

10:00 - 10:05	Inviting Dignitaries to the dais and felicitation	
10:05 - 10:15	Welcome address by the Suryamitra Program coordinator in Tezpur University	Prof. D C Baruah Joint Coordinator, Suryamitra Program
10:15 - 10:25	Importance of Skill Development Program	Dr. A K Misra Director, AEDA
10:25 - 10:35	Genesis of Suryamitra Skill Development Program	Mr. Mrinal K Chaudhury Additional Director, AEDA
10:35 - 10:45	Speech by Guest of Honour	Dr. Biren Das Registrar, Tezpur University
10:45 - 10:50	Address by Local Entrepreneur and Guest Trainer	Mr. Sanjeev Sarma Electro Sales, Guwahati
10:50 - 11:00	Speech by the participants	Three Participants
11:00 - 11:10	Distribution of Certificates to the participants	
11:10 - 11:15	Vote of Thanks	Dr Nabin Sarmah Joint Coordinator, Suryamitra Program
High Tea		


Head
Department of Energy
Tezpur University



