

**Five-Day CEP Short Term course**  
**On**  
**Solar Photovoltaics**  
**for**  
**Master Trainers of Technicians**

**31<sup>st</sup> August-4<sup>th</sup> September, 2015**

**Venue:-**

**VMCC Seminar Hall,  
Room No. 11, 1<sup>st</sup>Floor,  
IIT Bombay**

**Course Coordinator**

**Prof. Chetan Singh Solanki**



Continuing Education Program (CEP)

**National Centre for Photovoltaic Research and Education**  
**Indian Institute of Technology, Bombay**

## Schedule

**1<sup>st</sup> Day – 31<sup>st</sup> August, 2015**

Time	Module	Title	Speaker
8:30-9:00		Registration & Tea and Breakfast	
9:00-9:15		Introduction to NCPRE and Training Program	Prof. C.S. Solanki
9:15-10:00	Lecture 1	Introduction to Renewable Energy and Solar PV	Prof. C.S. Solanki
10:00-11:00	Lecture 2	Introduction to Solar Cells, Modules and Arrays	Prof. C.S. Solanki
11:00-11:15		Tea	
11:15-12:00	Lecture 3	Basics of Electricity	S Sashidhar
12:00-1:00	Lecture 4	Solar Radiation Basics and Introduction to measuring devices	Shashwata Chattopadhyay
1:00-2:00		Lunch	
2:00-3:00	Lab 1	Identifying and measuring the parameters of a solar PV module in the field	Vaman, S Sashidhar, Ms. Kavita Santosh, Firoz Ansari, Dr. Chalapathi and Rambabu
3:00-3:45	Field 1	Field Measurement of PV Module parameters, temperature and radiation	Vaman, S Sashidhar, Ms. Kavita Santosh, Firoz Ansari, Dr. Chalapathi and Rambabu, Ritesh Upadhye (MEPC)
3:45-4:00		Tea on Terrace	
3:45-4:30	Field 2	Series and Parallel connections of PV modules	Vaman, S Sashidhar, Ms. Kavita Santosh, Firoz Ansari, Dr. Chalapathi and Rambabu, Ritesh Upadhye (MEPC)
4:30-5:30	Classroom	Calculations of Field Modules 1 and 2 and Discussions	Vaman Kuber, S Sashidhar, Ms. Kavita Santosh and Participants

## Schedule

**2<sup>nd</sup> Day –1<sup>st</sup>Sept, 2015**

<b>Time</b>	<b>Module</b>	<b>Title</b>	<b>Speaker</b>
9:30-10:30	Lecture 5	PV Array Layout and Energy Yield	Vaman Kuber
10:30-11:00		Tea	
11:00-12:00	Lab 2	Monitor effect of sun tracking on energy generation	Vaman, S Sashidhar, Ms. Kavita Santosh, Firoz Ansari, Dr. Chalapathi and Rambabu
12:00-1:00		Lunch	
1:00-1:45	Lecture 6	Battery Basics and Parameters	S Sashidhar
1:45-2:30	Lecture 7	Charge Controller Basics and Parameters	Vaman Kuber
2:30-3:30	Field 3	Solar DC LED Street Light Operation and Monitoring	Vaman, , S Sashidhar, Ms. Kavita Santosh, Firoz Ansari, Dr. Chalapathi and Rambabu
3:30-4:00		Tea	
4:00-4:30	Quiz 1	Quiz - Day 1 Topics	Vaman Kuber, , S Sashidhar, Ms. Kavita Santosh and Participants
4:30-5:30	Classroom	Calculations of Field Modules 2 and 3 and Discussions	Vaman Kuber, S Sashidhar, Ms. Kavita Santosh and Participants

## Schedule

**3<sup>rd</sup> Day – 2<sup>nd</sup> Sept, 2015**

<b>Time</b>	<b>Module</b>	<b>Title</b>	<b>Speaker</b>
9:30-10:30	Lecture 8	Inverter Basics and Parameters	Ms. Kavita Santosh
10:30-11:00		Tea	
11:00-12:00	Lecture 9	System Basics and Sizing	Vaman Kuber
12:00-1:00	Exercise 1	System Sizing Exercise	Vaman Kuber, S Sashidhar, Ms. Kavita Santosh and Participants
1:00-2:00		Lunch	
2:00-3:00	Lab 3, Field 4	Solar AC LED Street Light Operation and Efficiency Monitoring	Vaman, S Sashidhar, Ms. Kavita Santosh, Firoz Ansari, Dr. Chalapathi and Rambabu
3:00-4:00	Classroom	Calculations of Field Module 4 and Discussions	Vaman Kuber, S Sashidhar, Ms. Kavita Santosh and Participants
4:00-4:30		Tea	
4:30-5:30	Field Visit 1	PV Module Lab Tour	Vaman, Firoz Ansari, Dr. Chalapathi and Rambabu
4:30-5:30	Quiz 2	Quiz - Day 2 Topics	Vaman Kuber, S Sashidhar, Ms. Kavita Santosh and Participants

## Schedule

4<sup>th</sup> Day –3<sup>rd</sup> Sept, 2015

Time	Module	Title	Speaker
9:30-10:15	Lecture 10	DC and AC BoS Components	Dr. Vinay Hasabnis (Savitra Solutions)
10:15-11:15	Field 5	PV Panel Assembly	Vaman, Firoz Ansari, Dr. Chalapathi and Rambabu, Ritesh Upadhye (MEPC)
10:30-10:45		Tea on Terrace	
11:15-12:00	Lecture 11	PV power plant Safety, Assembly, Installation and Testing Processes, Tools and Equipment	Dr. Vinay Hasabnis (Savitra Solutions)
12:00-1:00	Lecture 12	Installation, Testing, Maintenance and Safety of Batteries, Charge Controllers and Inverters	Dr. Vinay Hasabnis (Savitra Solutions)
1:00-2:00		Lunch	
2:00-5:30	Field Visit 2	Field Visit to PV Powertech	Vaman Kuber, Dr. Vinay Hasabnis, Mr. Jimmy Desai and Participants

## Schedule

**5<sup>th</sup> Day –4<sup>th</sup> Sept, 2015**

<b>Time</b>	<b>Module</b>	<b>Title</b>	<b>Speaker</b>
9:30-10:15	Field 6	DC Cables, PV String Assembly and Inverter Testing	Vaman, S Sashidhar, Ms. Kavita Santosh,Firoz Ansari, Dr. Chalapathi and Rambabu, Ritesh Upadhye (MEPC)
10:00-10:30		Tea on Terrace	
10:15-11:00	Field 7	AC Cables, ACDB Operation, Energy Metering, Power Evacuation and Communication	Vaman, S Sashidhar, Ms. Kavita Santosh,Firoz Ansari, Dr. Chalapathi and Rambabu, Ritesh Upadhye (MEPC)
11:00-12:00	Lecture 13	PV Power Plant Operation and Maintenance	Chetan Bane and Ritesh Upadhye (MEPC)
12:00-12:30	Field 8 and 9 (Classroom)	Plant, Solar and Weather Monitoring and SCADA Demonstration	Chetan Bane and Ritesh Upadhye (MEPC)
12:30-1:30		Lunch	
1:30-3:00	Field Visit 3	Solar Cell Fabrication and Characterization Lab. Visits	Vaman Kuber, Dr. Diksha Makwani
1:30-3:00	Classroom	Discussion on Field Experience	Vaman Kuber and Participants
3:00-3:30		Tea	
3:30-4:30	Classroom	Feedback and Certificate Distribution	Prof. C.S. Solanki, Vaman Kuber