

**Five-day CEP Short Term course**  
**On**  
**Solar PV Training for Technicians**

**9<sup>th</sup> -13<sup>th</sup> March, 2015**

**Venue:-**

**VMCC, IIT Bombay**

**Course Coordinator**

**Prof. Chetan Singh Solanki**

**Department of Energy Science Engineering.**



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

## Schedule

**1<sup>st</sup> Day –9<sup>th</sup> March, 2015**

<b>Time</b>	<b>Module</b>	<b>Title</b>	<b>Speaker</b>
8:30-9:15		Registration& Tea and Breakfast	
9:15-9:30		Introduction to NCPRE and Training Program	Prof. C.S. Solanki
9:30-10:15	Lecture 1	Introduction to Renewable Energy and Solar PV	Prof. C.S. Solanki
10.15-11:30	Lecture 2	Introduction to Solar Cells, Modules and Arrays	Prof. C.S. Solanki
11.30-12:00		Tea	
12:00-1:00	Lecture 3	Solar Radiation Basics and Introduction to measuring devices	Vaman Kuber/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, Shashwata, Jim, Rajiv, Vivek, Firoz and Ravi
3:00-3:45	Field 1	Field Measurement of PV Module parameters, temperature and radiation	Vaman, Shashwata, Jim, Rajiv, Vivek, Firoz and Ravi, Chetan Bane & Ritesh Upadhye (MEPC)
3:45-4:00		Tea on Terrace	
4:00-4:45	Field 2	Series and Parallel connections of PV modules	Vaman, Shashwata, Jim, Rajiv, Vivek, Firoz and Ravi, Chetan Bane & Ritesh Upadhye (MEPC)
4:45-5:30	Classroom	Calculations of Field Modules 1 and 2 and Discussion	Vaman Kuber and Participants

## Schedule

2<sup>nd</sup> Day – 10<sup>th</sup> March, 2015

Time	Module	Title	Speaker
9:15-9:45	Quiz 1	Quiz - Day 1 Topics	
9:45-10:30	Lecture 4	PV Array Layout and Energy Yield	Vaman Kuber
10:30-11:00		Tea	
11:00-12:15	Lab 2	Monitor effect of sun tracking on energy generation	Vaman, Shashwata, Jim, Rajiv, Vivek, Firoz and Ravi
12:15-1:00	Lecture 5	Basics of Electricity	Rajesh Farswan
1:00-2:00		Lunch	
2:00-2:45	Lecture 6	Battery Basics and Parameters	Vishal Vekhande
2:45-4:00	Field 3	Solar DC LED Street Light Operation and Monitoring	Vaman, Shashwata, Jim, Rajiv, Vivek, Firoz and Ravi
4:00-4:30		Tea	
4:30-5:30	Lecture 7	Charge Controller Basics and Parameters	Vaman Kuber/Rajesh Farswan

## Schedule

3<sup>rd</sup> Day – 11<sup>th</sup> March, 2015

Time	Module	Title	Speaker
9:15-9:45	Quiz 2	Quiz - Day 2 Topics	
9:45-10:45	Lecture 8	Inverter Basics and Parameters	Vaman Kuber/Vishal Vekhande
10:45-11:15		Tea	
11:15-12:45	Lab 3	Efficiency Measurement of Standalone Solar PV system	Vaman, Shashwata, Jim, Rajiv, Vivek, Firoz and Ravi
12:45-1:45		Lunch	
1:45-2:45	Lecture 9	System Basics and Sizing	Vaman Kuber
2:45-4:00	Field 4	Solar AC LED Street Light Operation and Monitoring	Vaman, Shashwata, Jim, Rajiv, Vivek, Firoz and Ravi
4:00-4:30		Tea	
4:30-5:30	Exercise 1	System Sizing Exercise	Vaman Kuber and Participants

## Schedule

4<sup>th</sup> Day – 12<sup>th</sup> March, 2015

Time	Module	Title	Speaker
9:15-9:45	Quiz 3	Quiz - Day 3 Topics	
9:45-10:30	Lecture 10	PV power plant Safety, Assembly, Installation and Testing Processes, Tools and Equipment	Vinay Hasabnis
10:30-11:00		Tea	
11:00-12:00	Field 5	PV Panel Assembly	Vaman, Shashwata, Jim, Rajiv, Vivek, Firoz and Ravi, Chetan Bane & Ritesh Upadhye (MEPC)
12:00-1:00	Lecture 11	DC and AC BoS Components	Vinay Hasabnis
1:00-2:00		Lunch	
2:00-3:00	Lecture 12	Installation, Testing, Maintenance and Safety of Batteries, Charge Controllers and Inverters	Vinay Hasabnis
3:00-3:15		Tea	
3:15-5:30	Visit	Field Visit to MG Solar Powertronics	Vaman Kuber, Vinay Hasabnis and Smita Bhattacharya

## Schedule

**5<sup>th</sup> Day – 13<sup>th</sup> March, 2015**

<b>Time</b>	<b>Module</b>	<b>Title</b>	<b>Speaker</b>
9:15-10:15	Field 6	DC Cables, PV String Assembly and Inverter Testing	Vaman, Shashwata, Jim, Rajiv, Vivek, Firoz and Ravi, Chetan Bane & Ritesh Upadhye (MEPC)
10:15-10:45		Tea on Terrace	
10:45-11:45	Field 7	AC Cables, ACDB Operation, Energy Metering, Power Evacuation and Communication	Vaman, Shashwata, Jim, Rajiv, Vivek, Firoz and Ravi, Chetan Bane & Ritesh Upadhye (MEPC)
11:45-12:30	Lecture 13	PV Power Plant Operation and Maintenance	Chetan Bane
12:30-1:00	Classroom	Discussion on Field Experience	Vaman Kuber, Vinay Hasabnis, Chetan Bane and Participants
1:00-2:00		Lunch	
2:00-3:00	Field 8 and Classroom	Plant, Solar and Weather Monitoring and SCADA	Vaman, Shashwata, Jim, Rajiv, Vivek, Firoz and Ravi, Chetan Bane & Ritesh Upadhye (MEPC)
3:00-3:30		Tea	
3:30-4:30	Field 9	O&M Checks	Vaman, Shashwata, Jim, Rajiv, Vivek, Firoz and Ravi, Chetan Bane & Ritesh Upadhye (MEPC)
4:30-5:00	Classroom	Feedback and Certificate Distribution	Prof. C.S. Solanki, Vaman Kuber