

**DEPARTMENT OF ENERGY SCIENCE AND ENGINEERING, IIT BOMBAY**

**EN 308 Solar Energy Lab**

The **list of experiments** to be performed during the semester is as follows:

Exp. No.	List of experiments	Venue
1	1a: Measurement of solar radiation and sunshine hours	Terrace
	1b: Measurement of solar radiation and reflectivity	
2	Solar PV modules and their I-V characteristics	Energy Systems Lab
3	3a: DC to DC and DC to AC conversion set up	Terrace
	3b: Energy yield analysis of a PV module in fixed and 2D-tracked mode of operation	
	3c: Economic payback period of tracking system retrofitted in a 10 MW solar PV plant	
4	MPPT training system	Terrace
5	5a: Grid synchronization of solar PV inverter and its performance analysis	Energy Systems Lab
	5b: Spectral response measurement of solar cell	
6	Solar pumping	Energy Systems Lab
7	7a: Performance of box-type solar cooker	Terrace
	7b: Performance of basin-type solar still	
8	8a: Forced circulation evacuated tube collector	Terrace
	8b: Natural circulation evacuated tube collector	
9	Natural circulation flat plate collector and demonstration of forced circulation flat plate collector system	Terrace
10	Solar air heater	Terrace
11	Demonstration of parabolic trough collector	Terrace
12	Demonstration of thermal energy storage system	Energy Systems Lab

**Schedule for the experiments:**

Month	Jan	Jan	Jan	Feb	Feb	Feb	Mar	Mar	Mar	Mar	Apr	Apr	Apr
Date	15	22	29	05	12	19	05	12	19	26	02	09	16
Group code ↓	Experiment no. ↓												
G1	Experiment 1	2	10	9	8	7	6	5	4	3	Experiments 11 and 12		End Semester Viva
G2		3	2	10	9	8	7	6	5	4			
G3		4	3	2	10	9	8	7	6	5			
G4		5	4	3	2	10	9	8	7	6			
G5		6	5	4	3	2	10	9	8	7			
G6		7	6	5	4	3	2	10	9	8			
G7		8	7	6	5	4	3	2	10	9			
G8		9	8	7	6	5	4	3	2	10			
G9		10	9	8	7	6	5	4	3	2			

**Notes:**

1. The terrace is on a one-storey building behind the QIP building (married research scholar quarters), opposite to the 1<sup>st</sup> year UG Physics/Chemistry labs.
2. **Experiment 1** will be conducted on **15 January** for all groups, we will begin at **13:00**. The rest of the lab sessions will start from **13:45**. It is a must to be on time.
3. **Experiments 10 and 11** are demonstrations of the respective technologies. The schedule will be provided at a later stage.
4. It is a **must** to perform **all** the experiments to pass the lab. The lab will be conducted in slot **L2**. You will be informed of any changes well in advance. The students are distributed in groups as per the given list.

**Group composition:**

S. No.	Roll No.	Name	Groups for experiments 1, 11, and 12	Groups for experiments 2-10
1.	160110036	Saraf Pushkar Umesh	<b>G1</b>	<b>G1</b>
2.	15D170023	Oni Malhotra	G1	G1
3.	16D170002	Chaubal Soumil Kishor	G1	G1
4.	16D170003	Ansari Mohammad Razi Mohammad Rehan	G1	<b>G2</b>
5.	16D170004	Aryan Agal	G1	G2
6.	16D170007	Kumaresh Ramesh	G1	G2
7.	16D170008	Trishant Roy	G1	<b>G3</b>
8.	16D170009	Deshpande Varad Pramod	G1	G3
9.	16D170010	Mohite Indrajeet Nagesh	G1	G3
10.	16D170011	Menon Govind Rajesh	<b>G2</b>	<b>G4</b>
11.	16D170012	Amlekar Shrvan Shrikrishna	G2	G4
12.	16D170013	Kshirsagar Pranav Bapu	G2	G4
13.	16D170014	Vyanktesh Ishwarchandra Nagre	G2	<b>G5</b>
14.	16D170015	Chitrangna Bhatt	G2	G5
15.	16D170016	Ankit S Battise	G2	G5
16.	16D170017	Rahul Kumar Meena	G2	<b>G6</b>
17.	16D170018	Premanshu Kumar Singh	G2	G6
18.	16D170019	Aditi Mahajan	G2	G6
19.	16D170020	Aayush Garg	<b>G3</b>	<b>G7</b>
20.	16D170021	Sourabh Surage	G3	G7
21.	16D170022	Manoj Vishwakarma	G3	G7
22.	16D170023	Abhishek Sisodiya	G3	<b>G8</b>
23.	16D170025	Anshul Mahor	G3	G8
24.	16D170026	Satyaprajna Sarthak Sahoo	G3	G8
25.	16D170027	Prabhat Ranjan	G3	<b>G9</b>
26.	16D170029	Kondeti Isaiah Benedict	G3	G9
27.	16D170031	Anant Taraniya	G3	G9

**Instructions regarding the lab:**

1. Do not copy or unnecessarily increase the number of pages in your report. Submit the **group** lab reports using the template provided to you for the submission of the lab reports.
2. The experiment report should be submitted **by 17:00 two days** after the experiment on Moodle as a **pdf** file. **Zero** marks will be awarded for the report if deadline is missed or if reports are found to be plagiarised.
3. Read the manual carefully **before** coming to lab for each experiment. There will be a viva based on the manuals at the beginning of each experiment.
4. **Individual** viva based on the experiment will be conducted both before the start of the experiment (4 marks) and after submitting report (6 marks) on the following lab session during the experiment.
5. Evaluation will be on the basis of report and viva. For each experiment, 10 marks will be for report and 10 marks will be for the viva (viva 10 marks = 4 marks at the beginning of experiment + 6 marks in the following session). The end semester exam will be of 10 marks, the details of that will be informed later.
6. There is a **penalty** of 2 marks from second viva (out of 6 marks) for coming late to the experiments.

**Useful reference:**

Sukhatme, SP and Nayak, JK, 'Solar Energy', 4<sup>th</sup> edition, McGraw Hill Education, India, 2018.

**Faculty in charge:**

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**List of TAs:**

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3.	173170006	Rishabh Chaturvedi	<b>1, 10</b>	173170006@iitb.ac.in
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5.	174170001	Puranik Vishal Eknath	<b>3</b>	174170001@iitb.ac.in
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10.	174170005	Manoj Kumar Yadav	<b>8</b>	174170005@iitb.ac.in
11.	174176004	Irfan Mohammad Sabir Shaikh	<b>9</b>	174176004@iitb.ac.in
12.	14D170001	Shah Shantanu Shalin	<b>Manuals</b>	14D170001@iitb.ac.in
13.	184170004	Kinshuk Shekhar	<b>Fabrication</b>	184170004@iitb.ac.in
14.	184170006	Vijay Shanker	<b>Fabrication</b>	184170006@iitb.ac.in
15.	184170008	Abhishek Suman	<b>Fabrication</b>	184170008@iitb.ac.in