

Course Type	Course Code	Name of Course	L	T	P	Credit
DP	NMEC532	Solar Thermal Lab	0	0	3	1.5

Course Objective

This is introductory laboratory course on Solar Thermal Labs. This course aims to provide fundamentals concepts and their application of various solar labs. They will be learning about handling and analyzing the performance of various solar power systems.

Learning Outcomes

Upon successful completion of this course, students will:

- have a broad understanding of various solar labs.
- have analytical and mathematical tools to handle complex problems.
- be able to provide some basic handling and analyzing the performance of various solar labs.

Unit No.	Topics to be Covered Lecture	Lab Hours	Learning Outcomes
1	Solar radiation flux measurements using pyranometer	3	Students will learn measuring Solar radiation flux.
2.	Performance of single pass solar air heater	3	Students will learn about handling and studying the performance of single pass solar air heater.
3.	Performance of multi pass solar air heater	3	This module will enable the students to handle and study the performance of multi pass solar air heaters.
4.	Performance of single pass solar air heater with conventional jet plate	3	This module will enable the students to understand, handle and study the performance of a single pass solar air heater with conventional jet plate.
5.	Performance of multi pass solar air heater with conventional jet plate	3	This module will enable the students to understand, handle and study the performance of a multi pass solar air heater with conventional jet plate.
6.	Performance of single / multi pass solar air heater with modified jet plate	3	Students will learn about learning the performance of a concentric solar heater.
7.	Performance of concentric solar heater	3	Students will learn about handling and analyzing the performance of a concentric solar heater.
8.	Performance of solar air heater with Inclined mirror reflector	3	Students will learn about handling and analyzing the performance of a solar air heater with Inclined mirror reflector.
9.	Thermal Performance analysis of Dimple based solar air heater at different mass flow rates	3	This module will enable the students to understand, handle and study the performance of a dimple based solar air heater.
10.	Thermal performance analysis of hybrid PVT system for electricity production and heat energy storage	3	This module will enable the students to understand, handle and study the performance of a hybrid PVT system for electricity production.
11.	Thermal performance of thermal energy storage system	3	Students will learn about handling and analyzing the performance of a thermal energy storage system.

12.	Report submission and evaluation	3	Students will submit the lab reports and appear for a test/viva-voce.
Total		42	

Text books:

1. S. P. Sukhatme, Solar Energy - Principles of Thermal Collection and Storage, TMH, 3rd Edition, 2008.
2. John A. Duffie and William A. Beckman, Solar Engineering for Thermal Process, Wiley and Sons, 1st Edition, 2013.

References:

1. H. P. Garg, Solar Energy, 1st Revised Edition, 2000.