

# Refrigeration, Air Conditioning & Energy Laboratory

**Laboratory Coordinator:** Prof. S. S. Deshmukh ([ssd@hyderabad.bits-pilani.ac.in](mailto:ssd@hyderabad.bits-pilani.ac.in))

**Laboratory Technical Assistant:** Mr. N. Jagadeshwar Reddy

**Location:** E-221



Refrigeration, air-conditioning & Energy laboratory in the Department of Mechanical Engineering. The laboratory has always been buzzing with creative activity with several PhD research, Higher Degree dissertation and First Degree thesis. There are 18 experimental setups available in the laboratory. These experiments help the students to understand refrigeration air-conditioning system and solar thermal process engineering practically.

These experiments also pave way for inculcating certain innovative skills in the students making them to use the below experimental setups as starting point to take up higher level experimental studies in Refrigeration, air-conditioning & solar thermal process engineering (Energy).

## LIST OF EQUIPMENTS:

SL No.	Name of the Equipment	Utility
1	Cooling Tower Test Rig.	<i>These experiments are used by undergraduate students, as part of basic "REFRIGERATION &amp;</i>

2	Heat pump Test Rig.	<p>AIRCOND” course offered in the Department of Mechanical Engineering;</p> <p>Students would learn Refrigeration, air-conditioning system</p>
3	Ice Plant Test Reg.(24Kg/Day)	
4	Refrigeration Test Rig.	
5	Vapor Absorption Test Rig.	
6	Window AC Test Rig. .8 Ton	
7	Focusing Type Parabolic Solar Collector	Study of focusing type parabolic solar collector
8	Solar water Heater Apparatus (100 Ltr)	Study of Solar water heater apparatus
9	AR-200W Wind Turbine System	Study of wind turbine
10	Campbell Scientific Solar Radiation Monitoring Station	Study of Solar radiation, Wind speed and direction, Air temperature and relative humidity
11	Data logger	High speed data acquisition system with different modules for the measurement of temperature, vibration, etc
12	Solar Thermal Training System	<p><i>These experiments are used by undergraduate and graduate students;</i></p> <p>Solar Flat-Plate Collector Based system is a replica of the solar water heating system designed in a form of experimental setup to help students learn and experience different parameters of performance of Flat Plate Collector System. This system helps students in practical understanding of various technical parameters such as Overall Heat Loss Co-efficient, Heat Removal Factor and Efficiency at different flexible input parameters like radiation, wind speed etc. The system has in built sensors which measure parameters like pressure, temperature, and flow rate etc, mounted on a control unit.</p>
13	Solar Parabolic through Collector based System	<p><i>These experiments are used by undergraduate and graduate students;</i></p> <p>The Solar Parabolic Trough Collector Based System consists of parabolic reflectors, absorber tube, sun tracker, piping, storage tanks and a heat exchanger. A control panel would control different devices and also measure the different parameters of the system. The system can be used to perform experiments in heat transfer, parabolic trough characteristics and heat loss at different parts of the system. The system is highly flexible – it can be used with different working fluids, different absorbing materials, different piping</p>

		insulation thickness and different types of storages tanks. This gives a lot of scope for research in heat transfer and related fields. Wind speed variation and flow velocity are other parameters which can be changed to show their impact on heat transfer and heat loss.
14	Solar PV Training System	<i>These experiments are used by undergraduate and graduate students;</i> The Solar PV Training & Research Kit is a mini-Solar PV Plant Prototype which enables students to understand in-depth concepts about stand-alone PV systems. The product also provides research orientation on several concepts such as MPPT, inverter control etc.
15	Open Pan Evaporator	Study of Vaporization efficiency of Open Pan
16	Single Effect Evaporator	Study of operation of evaporator and also determines the overall heat transfer coefficient of the evaporator.
17	Calandria Evaporator	Study of operation of evaporator and also determines the overall heat transfer coefficient of the Calandria evaporator.
18	Water Bath(Thermostatic)	To maintain the constant water temperature