

# Refrigeration & Air Conditioning Laboratory (RAC Lab)

## About the Laboratory

The **Refrigeration and Air Conditioning (RAC) Laboratory** provides hands-on training in thermal system dynamics, vapor compression cycles, and psychrometric processes. Equipped with VCR test rigs, air conditioning tutors, vapor absorption systems, and diagnostic tools, it enables students to evaluate system performance and determine the Coefficient of Performance (COP). Key activities include conducting lab experiments, analyzing HVAC processes, and carrying out research on eco-friendly refrigerants and energy-efficient cooling technologies.

## Faculty In-Charge

**Dr. Gulshan Sachdeva**

## Technical Staff

- **Mr. Himanshu**
- **Mr. Krishan Kumar**

## Laboratory Courses

| Course Code | Course Name                            | Programme |
|-------------|----------------------------------------|-----------|
| MEPC327     | Refrigeration and Air Conditioning (P) | B.Tech.   |

## Major Equipment

| Equipment                                                 | Quantity | Utilization |
|-----------------------------------------------------------|----------|-------------|
| Blower Test Equipment                                     | 01       | B.Tech.     |
| Ice Plant Test Rig                                        | 01       | B.Tech.     |
| Computerized Recirculating Type Air-Conditioning Test Rig | 01       | B.Tech.     |
| Vapour Absorption Refrigeration System                    | 01       | B.Tech.     |
| Air & Water Heat Pump                                     | 01       | B.Tech.     |
| Experimental Window A/C Unit                              | 01       | B.Tech.     |

| <b>Equipment</b>                                                                                                                                   | <b>Quantity</b> | <b>Utilization</b> |
|----------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|--------------------|
| Gas Charging Station                                                                                                                               | 01              | B.Tech.            |
| Troubleshooting Package Unit                                                                                                                       | 01              | B.Tech.            |
| Automotive Air-Conditioner Trainer                                                                                                                 | 01              | B.Tech.            |
| Cut-Sectioned Compressor Models – Semi-Sealed Compressor, Hermetically Sealed Compressor, Reciprocating Type Compressor and Rotary Type Compressor | 04              | B.Tech.            |

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## Laboratory Photographs

| SR.NO. | DESCRIPTION OF EQUIPMENT | IMAGE OF EQUIPMENT                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|--------|--------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1      | BLOWER TEST EQUIPMENT    |  <p>A photograph of a blower test equipment setup. It features a green motorized blower unit mounted on a red base. A long, horizontal blue pipe with red flanges extends from the blower. A small blue sign with white text "Blower Test Equipment" is attached to the top of the green unit. The setup is in a room with white tiled walls and a concrete floor.</p>         |
| 2      | ICE PLANT TEST RIG       |  <p>A photograph of an ice plant test rig. It consists of a white control panel with various gauges, switches, and digital displays. Below the panel is a large, rectangular, stainless steel brine tank with ice cans. The entire setup is mounted on a black metal frame with wheels. A power supply unit and various cables are visible on the left side of the panel.</p> |

3

COMPUTERISED  
RECIRCULATING  
TYPE AIR -  
CONDITIONING  
TEST RIG



4

VAPOUR  
ABSORPTION  
REFRIGERATION  
SYSTEM



5

AIR & WATER  
HEAT PUMP



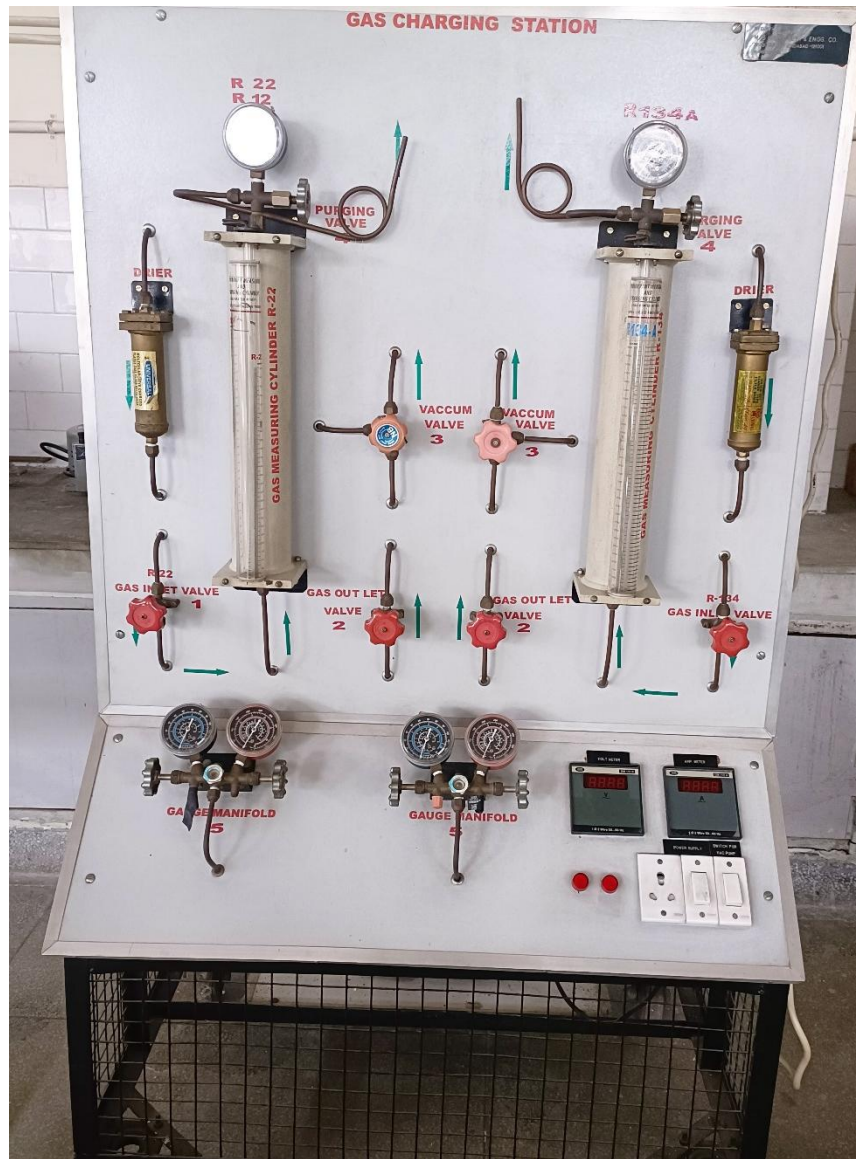
6

EXPERIMENTAL  
WINDOW A/C  
UNIT



7

GAS CHARGING  
STATION



|   |                               |                                                                                     |
|---|-------------------------------|-------------------------------------------------------------------------------------|
|   |                               |                                                                                     |
| 8 | TROUBLE SHOOTING PACKAGE UNIT |  |

|   |                                              |                                                                                     |
|---|----------------------------------------------|-------------------------------------------------------------------------------------|
|   |                                              |                                                                                     |
| 9 | AUTOMOTIVE<br>AIR-<br>CONDITIONER<br>TRAINER |  |

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|----|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|    |                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 10 | <p>CUT SECTIONED MODEL OF COMPRESSORS;</p> <ol style="list-style-type: none"> <li>1. SEMI SEALED COMPRESSOR</li> <li>2. HERMATICALLY SEALED COMPRESSOR</li> <li>3. RECIPROCATING TYPE COMPRESSOR</li> <li>4. ROTARY TYPE COMPRESSOR</li> </ol> |  <p>The image shows four cut-sectioned compressor models displayed on black metal stands against a white tiled wall. Each model is labeled with a blue sign above it:</p> <ul style="list-style-type: none"> <li><b>Semi Sealed Compressor:</b> A blue, cylindrical unit with a red motor and a cut-section revealing internal components.</li> <li><b>Hermetically Sealed Compressor:</b> A black, cylindrical unit with a red motor and a cut-section revealing internal components.</li> <li><b>Reciprocating Type Compressor:</b> A blue unit with a large flywheel and a cut-section revealing the piston and crank mechanism.</li> <li><b>Rotary Compressor:</b> A black unit with a green motor and a cut-section revealing the internal rotary mechanism.</li> </ul> |