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RESEARCH FACILITIES



ANITA



Centre for Energy and Environment
Malaviya National Institute of Technology Jaipur



ELECTROCHEMICAL WORKSTATION

This facility is a computerized general purpose Potentiostat/Bipotentiostat/Galvanostat. It provides Potential applications range from rotating ring-disk electrode (RRDE) experiments to any applications, where dual-channel measurements are essential, such as dual channel electrochemical detection.

Make & Model:

760E, CH Instruments, USA

Specifications/Features:

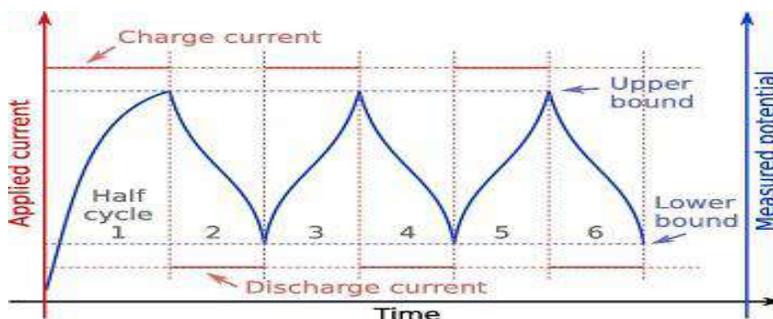
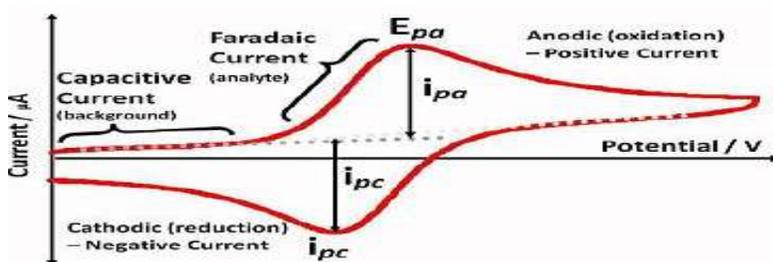
- ◆ A four-electrode configured Bi-Potentiostat/Galvanostat with high speed dual-channel DAQ circuitry
- ◆ Ability to measure both potential and current samples simultaneously at high frequency range up to 1MHz
- ◆ Ability to allow liquid/liquid interfacial measurements.
- ◆ Ability to get user-interface with Unicode tabbed document application

Applications:

- ◆ Useful in the field of electrochemical science, material science and simulation

Available mode for use:

- ◆ Stripping mode: enable/disable, deposition potential and time, stir and purge conditions
- ◆ Potentiometric Mode (Step and Pulse)
- ◆ Impedance Mode (AC impedance, IMPE/T, ACV/SHACV/FTACV)
- ◆ Galvanostatic Mode (CP, CPR, ISTEP and PSA)





BATTERY TESTING SYSTEM

This facility is a programmable battery testing system. It is capable of testing and analysing all standard battery types including chemistries of Lead acid, Ni-based, Li-based with real-time monitoring and testing conditions. It is used for determining the battery life using charging/discharging cyclic assessment.

Make & Model:

C8000, CADEX Electronics Inc., Canada

Specifications/Features:

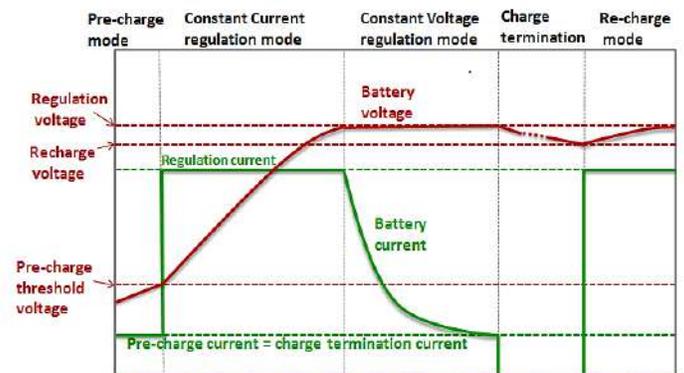
- ◆ A programmable charging and discharging facility with four independent channels
- ◆ Different programming for different battery chemistries
- ◆ Adapter units with adjustable arms and holder
- ◆ Integrated with Load Capture Unit (LCU)
- ◆ Auxiliary data ports for I/O for interfacing SM-Bus, Configurable Digital/Analog outputs or inputs

Applications:

- ◆ Useful in the field of life-cycle assessment of battery, charging/discharging battery with different rates (C-rate)

Available mode for use:

- ◆ Constant Current Mode (CC) for Charging
- ◆ Constant Voltage Mode (CV) for Discharging
- ◆ Load Capture Mode (External load)
- ◆ Single Unit/Interface Unit with specific TCP/IP protocol





CENTRIFUGE

This facility has a very fast turning (round) system that is used to separate substance by forcing the heavier substances to the outer edge. In this, an object is kept in rotation around a fix axis and a very strong force is applied in perpendicular to the axis of spin. It can be used for the separation of fluids, gas or liquids based on their density.

Make & Model:

NEYA 16R, REMI, India

Specifications/Features:

- ◆ A programmable facility of setting up rotation time and rpm
- ◆ A high-speed rotational gear-up with continuous mode of timer facility
- ◆ Ability to operate both at maximum of 9 acceleration and de-acceleration levels
- ◆ Ability support maximum 10 programs under protection -mode
- ◆ Ability to support automatic imbalance detection system

Applications:

- ◆ Useful for separation of electrochemical material science, biochemical sciences and physical sciences

Available mode for use:

- ◆ Centrifuge mode
- ◆ Standby mode





ENVIRONMENTAL CHAMBER

This facility provides very large range of chamber testing capabilities including temperature and humidity. High and low humidity can be simulated and combined with temperature and altitude extremes for comprehensive real-world simulation of environments can be provided by this facility. It can perform stand-alone test for environmental effects on test specimens, as preparation of test specimens for further physical tests or chemical tests or/and as environmental conditions for conducting testing of specimens. The chamber can be used for testing and exposing products to various environmental conditions in a controlled setting.

Make & Model:

ELAB-120, ELAB Solutions, India

Specifications/Features:

- ◆ A programmable facility of setting up temperature and humidity conditions
- ◆ Ability to work based on constant or varying environmental conditions
- ◆ Designed to simulate a specific environment or conditions--such as temperature, humidity
- ◆ Specialized unit modelled for extremely cold environments down to -20°C or temperatures as high as 120°C
- ◆ Ability to work on single setting/condition and as well as varying conditions based on 24 hours

Applications:

- ◆ Useful to model almost any environment, from the high arctic to the desert to the rainforest

Available mode for use:

- ◆ Current (Constant) mode
- ◆ Time based (Varying) mode





FUME HOOD

This facility is a type of local ventilation device that is designed to limit exposure to hazardous or toxic fumes, vapours or dusts. It is a specially designed work facility to reduce the loss of expensive tempered air from the lab. It is equipped with auxiliary air plenum to induce added airflow at face opening of the hood.

Make & Model:

ELAB-FMH, ELAB Solutions, India

Specifications/Features:

- ◆ Uni-Flow superstructure
- ◆ Access panel
- ◆ Full 30° viewing height
- ◆ Base Cabinets
- ◆ Fire extinguisher
- ◆ Air flow monitor
- ◆ Plumbing fixtures
- ◆ Epoxy work surface
- ◆ Sash stops
- ◆ External gas connections
- ◆ Optimum strength
- ◆ Smooth edges
- ◆ Flawless finish

Applications:

- ◆ Useful to reduce or eliminate exposure to volatile liquids, dusts, and mists
- ◆ Use to protect the user from inhaling toxic gases
- ◆ Use to protect the product or experiment
- ◆ Use to protect the environment

Available mode for use:

- ◆ Ventilation mode





DC ELECTRONIC LOAD

This facility is a 2-terminal programmable DC electronic load designed for testing and evaluating a variety of DC power sources. The DC Load can present dynamically changing loads to the DC source with millisecond switching times. The DC Load can be remotely programmed via a serial interface (USB virtual COM). Versatile triggering options allow the dynamic load behaviour to be synchronized with other events.

Make & Model:

8510, B&K Precision Corp. CA, USA

Specifications/Features:

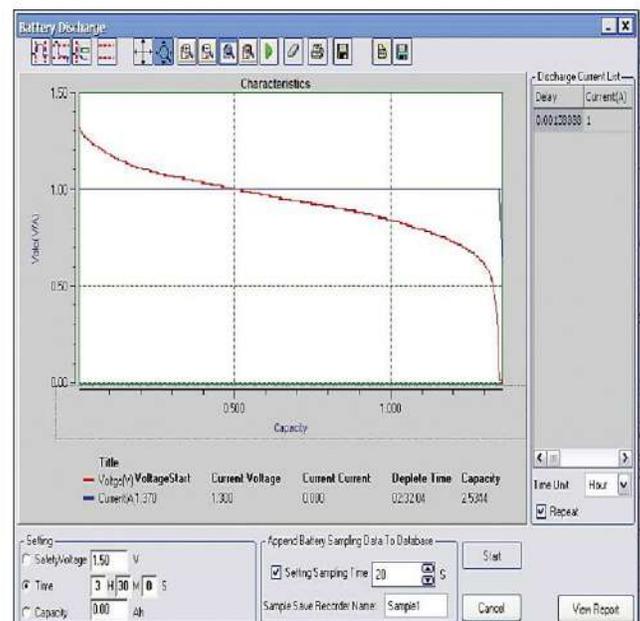
- ◆ Constant current (CC), resistance (CR), voltage (CV) and power (CP) operation
- ◆ 0-120V/120A/600W
- ◆ Built-in transient generator
- ◆ Short circuit test
- ◆ Over-Current/Over-Voltage/Over-Power/Over-Temperature Protection
- ◆ Battery testing mode
- ◆ Flexible triggering
- ◆ Remote voltage sensing
- ◆ Low minimum operating voltage of < 0.1 V

Applications:

- ◆ DC power supply testing
- ◆ Characterization of rechargeable batteries.
- ◆ Fuel and solar cell test
- ◆ High voltage applications

Available mode for use:

- ◆ List mode operation
- ◆ Battery testing mode





AC ELECTRONIC SOURCE

This facility is both a programmable AC source and a measurement tool. It is a fully programmable linear AC source, capable of delivering a maximum of 300 VA through the universal line output terminals on the front and the output connector on the rear. The output can be varied from 0 to 300 V with 0.1 V programming resolution.

Make & Model:

9801, B&K Precision Corp. CA, USA

Specifications/Features:

- ◆ 0 to 300 V, low distortion AC power source
- ◆ Output frequency adjustable from 45 Hz – 500 Hz
- ◆ Adjustable phase angle control
- ◆ Programmable voltage and frequency limit settings
- ◆ Built-in PLD and dimmer simulation
- ◆ Voltage and frequency sweep mode
- ◆ Standard USB (USBTMC-compliant), RS232, LAN and GPIB* interfaces
- ◆ OVP/OCP/OPP/OTP protection modes and key lock function
- ◆ Simulations according to IEC61000-4-11 / 4-14 / 4-28
- ◆ LabVIEW driver and soft panel for remote control available



Applications:

- ◆ Suitable for evaluating transformers
- ◆ Suitable for evaluating TRIACs, SCRs and passive components
- ◆ Suitable for evaluating R&D, service, and pre-compliance testing

Available mode for use:

- ◆ List mode operation: to build a wide range of waveforms in a sequence to simulate grid faults and disturbances
- ◆ Sweep mode: for testing the efficiency of SMPS or capturing the maximum operating power requirements of the device under test



RADIANT COOLING LAB WITH THERMAL STORAGE

- ◆ Cooling system that uses temperature controlled surfaces to remove sensible heat and cool the indoor space, primarily through radiation mode of heat transfer.
- ◆ These systems use water to circulate through the coils embedded on the panels attached to the ceiling, wall or floor to create and maintain thermally comfortable indoor environment.
- ◆ Dedicated outdoor Air system (DOAS) is required to provide conditioned air for ventilation and dehumidification.
- ◆ This lab is fully automated and proper controls are provided to prevent condensation on ceiling panels and operate the system either with chiller or with cooling tower depending on the ambient wet bulb temperature.
- ◆ Chilled water based thermal energy storage has been integrated with this existing cooling system.

Specifications:

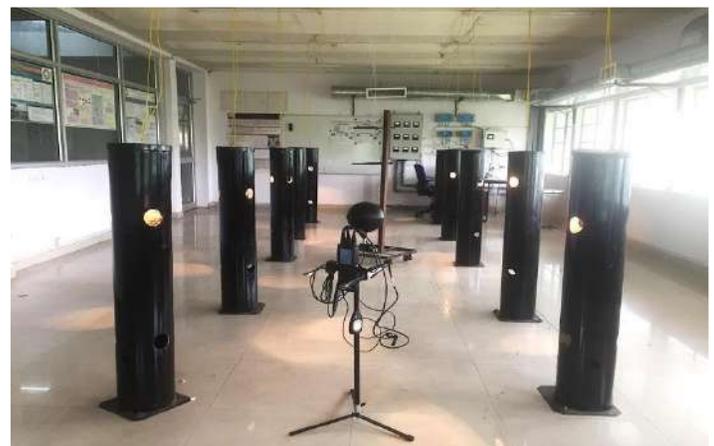
- ◆ Type of thermal storage: Sensible
- ◆ Thermal Storage Capacity: 6 TRh
- ◆ Tank's water storage capacity: 4000 liters
- ◆ No. of Tanks: 2
- ◆ Tank fabrication material: Mild steel
- ◆ Corrosion protection: Fibre-reinforced plastic(FRP) coating 1 mm thick
- ◆ Insulation material/thickness: Polyurethane foam/ 70 mm

Applications:

- ◆ Peak load shifting
- ◆ Cooling equipment size reduction
- ◆ Taking advantage of low ambient temperature in the night time to improve



Chiller plant



Radiant Cooling (Low Energy) lab



Chilled water based thermal storage



Psychrometric test facility:

- ◆ Two air-tight well insulated test chambers are constructed and integrated with Air handling units (AHUs), chillers and modular dedicated outdoor air system (DOAS).
- ◆ Proper instrumentation (accurate enough as per the prescribed standards) is done to measure the temperature, humidity, air velocity, differential pressure, flow rates, thermal energy, electrical energy etc.
- ◆ Fully automatic test facility, able to create controlled atmosphere (temperature and humidity) using programmable logic controller (PLC) and supervisory control and data acquisition (SCADA) system.

Specifications:

- ◆ 2 AHUs: 1000 CFM & 2000 CFM
- ◆ 2 Chillers: 5 TR & 10 TR capacity

DOAS Components:

- ◆ Enthalpy wheel
- ◆ Desiccant wheel
- ◆ Sensible wheel
- ◆ Low temperature & high temperature coils
- ◆ Indirect evaporative cooling unit
- ◆ Desiccant wheel's regeneration unit
- ◆ PLC & SCADA
- ◆ Control panels, VFDs, Energy meters, BTU meters, Velocity sensors, T & Rh sensors.

Applications:

This laboratory is being used to test the different air conditioning strategies for different climatic conditions and derive the most efficient cooling strategy for the respective climates depending on the energy consumption pattern and thermal comfort observed during the testing period.



Indoor test chamber



Outdoor test chamber



Air-handling units and chiller



DOAS unit with chiller



ADSORPTION CHILLER & EVACUATED TUBE COLLECTOR SET UP

- ◆ Low grade thermal energy (heat) is required to operate the adsorption chiller
- ◆ Chilled water generated from this chiller can be used in water based cooling system
- ◆ Hot water required for regeneration of adsorbent (silica gel) bed can be produced from evacuated tube collectors (ETC)

Specifications:

Adsorption Chiller:

- ◆ Rated capacity: 11 kW
- ◆ Rated COP: 0.55
- ◆ Chilled water temperature: 7-20°C
- ◆ Hot water temperature required for regeneration: 60-90°C
- ◆ Cooling water temperature required: 10-35°C
- ◆ Operating power consumption: 1.3 kW

Evacuated tube Collector:

- ◆ No. of tubes: 35
- ◆ Tube structure: all glass double tube co-axial
- ◆ Glass material: Borosilicate 3.3
- ◆ Outer tube diameter: 58 mm
- ◆ Inner tube diameter: 47 mm
- ◆ Tube length: 2100 mm
- ◆ Absorber coating: Cu/SS-AIN
- ◆ Average heat loss: <math><0.65 \text{ W/m}^2 \text{ K}</math>
- ◆ Buffer tank capacity: 1000 liter
- ◆ Inner tank sheet: Galvanized iron 2.5 mm
- ◆ Coating: Marine paint
- ◆ Insulation: PUF- high density 50 mm thick

Applications:

The hot water produced from ETC can be used in two ways:

- ◆ Operating the adsorption chiller in the summer season
- ◆ Use the hot water for heating the space in winter season by circulating through the radiant floor/ceiling panels.



Evacuated tube collectors with buffer tank



Adsorption Chiller



OASYS TWO STAGE INDIRECT/DIRECT EVAPORATIVE AC

Make:

Ambassador Coolers Private Limited, India

Specifications:

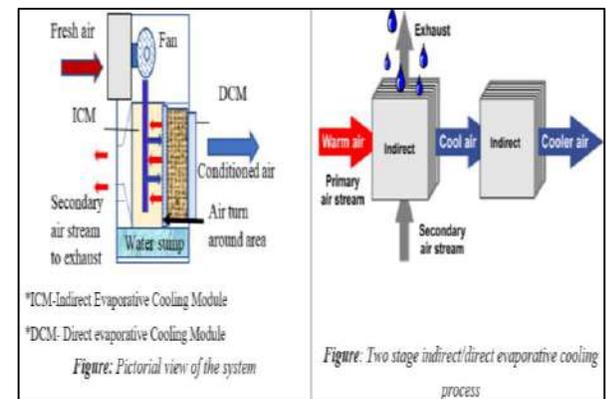
- ◆ Supply Air CFM: 1300
- ◆ Adiabatic efficiency: 110% (upto)
- ◆ Power rating: 600 Watt
- ◆ Heat Exchanger type: Indirect cooling module(Polymer flocked), Direct cooling module(Cellulose pad)
- ◆ Blower: Plug type backward curved centrifugal single blower
- ◆ Motor: 500 Watt GE Motor (720/810/900 rpm speed variation)
- ◆ Outer casing material: Fibre-reinforced plastic
- ◆ Duct material: 22 gauge galvanized iron
- ◆ Grill material: mild steel powder coated
- ◆ Water sump capacity: 40 liter

Applications:

Two-stage indirect evaporative coolers are becoming popular for achieving low temperature cooling set-point below WBT at higher system level efficiency. These coolers can be used in humid climates also unlike single stage evaporative coolers.

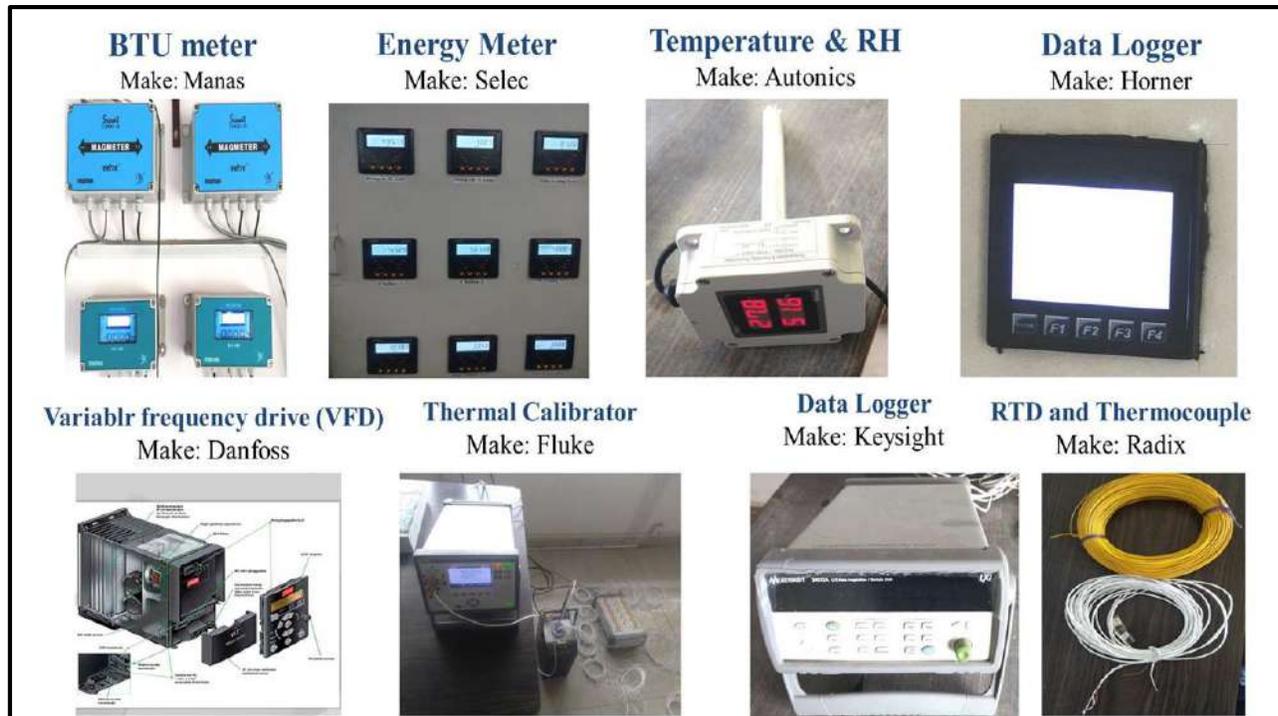


OASys two stage evaporator AC





INSTRUMENTS AND SENSORS



Hands-on training facilities available on:

- ◆ Hydronic (Radiant heating/Cooling) system.
- ◆ Thermal energy storage system (except cooling equipment downsizing test).
- ◆ Building Management System (BMS) control.
- ◆ Unitary air conditioner (Inverter and Non-inverter) performance testing.
- ◆ Enthalpy wheel, Sensible wheel and Desiccant wheel performance testing.
- ◆ Indirect and two stage evaporative cooler.
- ◆ Solar hybrid air conditioner performance testing.
- ◆ Different design of radiant ceiling panels with automatic condensation control strategy.
- ◆ Calibration of 2, 3, 4 wire RTDs and thermocouple temperature sensors.
- ◆ Fan performance characteristics for different geometries and configurations up to 3000 CFM.



GAS CHROMATOGRAPH

Gas chromatography is type of chromatography for separating and analysing gases and the compounds that can be vaporized without decomposition.

Make & Model:

Trace 1110, Thermofisher Scientific, India

Specifications/Features:

- ◆ Carrier gas: Helium
- ◆ Detector: Thermal conductivity detector

Applications:

- ◆ Analysis of biogas
- ◆ Percentage composition of Methane and Carbon dioxide





DIGITAL BOMB CALORIMETER

Bomb calorimeter is a constant volume calorimeter used to determine the energy contained in a material by measuring the heat generated during its combustion.

Make & Model:

SABC-01, Span automation, India

Specifications/Features:

- ◆ Water equivalent test
- ◆ Automatic measurement and calculation of calorific value /water equivalent
- ◆ Temperature scanning resolution: 0.01°C

Applications:

- ◆ Calorific value of biomass
- ◆ Calorific value of liquid fuel
- ◆ Fuel testing
- ◆ Explosive and propellant testing
- ◆ Thermodynamic studies





ORBITAL SHAKING INCUBATOR

This facility provides optimum condition viz. temperature and mixing, required for growth of microorganism in culture media.

Make & Model:

CIS - 24 plus, Remi, India

Specifications/Features:

- ◆ RPM range: 20 to 250 rpm
- ◆ Temperature Range: 5 to 60°C
- ◆ Accuracy: $\pm 5^{\circ}\text{C}$
- ◆ AC voltage supply: 220/230 V
- ◆ Maximum shaking capacity: 9 flasks x 2000 mL;
15x1000 mL; 24x500 mL; 33x250 mL; 49X100 mL
- ◆ Platform size: 580x600 mm



Applications:

- ◆ Incubation of samples on desired temperature
- ◆ Incubation of cultures on desired temperature along with shaking at desired rpm



THERMAL CYCLER

Thermal cycler is used to amplify the DNA through the process of polymerase chain reaction (PCR) which includes three major steps: denaturation, annealing, elongation.

Make & Model:

T100 Thermal Cycler, BioRad, USA

Specifications/Features:

- ◆ Sample capacity 96 x 0.2 ml tubes, 0.2 ml tube strips, or 1 x 96-well plate
- ◆ Maximum ramp rate: °C/sec: 4
- ◆ Average ramp rate °C/sec: 2.5
- ◆ Temperature range: 4–100°C
- ◆ Gradient range: 30–100°C
- ◆ Temperature differential range: 1–25°C

Applications:

- ◆ Nucleic acid amplification
- ◆ Gene cloning and analysis
- ◆ Gene expression analysis
- ◆ Mutational analysis
- ◆ Cycle sequencing





COD MULTIPARAMETER PHOTOMETER

Multiparameter photometer is a compact and versatile meter working on the principal of absorption, which is a typical phenomenon of interaction between electromagnetic radiation and matter.

Make & Model:

HI 83399, Hanna instrument, USA

Specifications/Features:

- ◆ Two measurement modes –
 - Absorbance
 - pH/mV
- ◆ Absorbance range: 0-4
- ◆ pH range: 2 to 16
- ◆ Temperature range: -20-120°C

Applications:

- ◆ COD of wastewater
- ◆ NPK value
- ◆ Alkalinity
- ◆ pH
- ◆ Conductivity
- ◆ Ammonia concentration





UV SPECTROPHOTOMETER

It uses light in the visible and adjacent ranges. The absorption or reflectance in the visible range directly affects the perceived color of the chemicals involved.

Make & Model:

UV-1800, Shimadzu, Japan

Applications:

- ◆ Photometric Mode: - It measures the absorbance or transmittance at a single wavelength or at multiple (up to eight) wavelengths.
- ◆ Spectrum Mode: - It obtains sample spectra using wavelength scanning.
- ◆ Quantitation Mode: - It generates a calibration curve from standard samples, and uses it to calculate the concentrations of unknown samples.
- ◆ Kinetics Mode: - It measures the change in absorbance as a function of time, and calculates enzymatic activity values.
- ◆ Bio-method Mode: - It is capable of analyzing DNA and proteins using the several common quantitation methods including quantitation of DNA or protein using the absorbance at 260/230 nm or 260/280 nm.





LAMINAR AIR FLOW CHAMBER

A laminar flow system is a vital concept in the control of particulate contamination. Laminar airflow is defined as air moving at the same speed and in the same direction, with no or minimal cross-over of air streams (or “lamina”).

Make & Model:

Sanco, India

Specifications/Features:

Horizontal Laminar Airflow Chamber:

- ◆ HEPA filters
- ◆ UV Lamps
- ◆ Stainless Steel Hood
- ◆ Acrylic fibre covers

Applications:

- ◆ Media Plate preparation
- ◆ Isolation of micro-organism
- ◆ Sterile condition in microbial and molecular techniques
- ◆ Plating of media
- ◆ Culturing of fungus and bacteria





MUFFLE FURNACE

It is a front-loading box type oven or kiln for high temperature applications. It is usually heated to desired temperature by conduction and convection from electrical resistance heater element.

Make & Model:

Sanco, India

Specifications/Features:

- ◆ Temperature Range: Room temperature to 700°C
- ◆ Chamber size: 20x20x35 cm
- ◆ AC voltage supply: 220/230 V

Applications:

- ◆ Determination of volatile solid
- ◆ Determination of ash content in biomass
- ◆ Biomass combustion





HOT AIR OVEN

Hot air oven is used in heating the sample at desired temperature and also removes moisture from the sample.

Make & Model:

Sanco, India

Specifications/Features:

- ◆ Temperature Range: Room temperature to 160°C
- ◆ Accuracy: $\pm 4^\circ\text{C}$
- ◆ Chamber size: 60x60x75 cm
- ◆ AC voltage supply: 220/230 V

Applications:

- ◆ Total solid content measurement
- ◆ Samples heating
- ◆ Sample drying
- ◆ Glassware drying





SOLAR RADIATION MEASUREMENT SYSTEM

This facility provides the Global, Direct and Diffuse solar radiations throughout the year.

Instrument Details:

- ◆ Razon + 180075, Kipp and Zonen, India
- ◆ General Specification: SRMS (Pyrheliometer + Pyranometer)

Applications:

- ◆ Measurement of the Global, Direct and Diffuse solar radiations
- ◆ Measurement of the altitude, zenith and azimuth angle of location

Technical Specifications:

Specification	Pyrheliometer	Pyranometer
Response time	< 0.2 s	< 0.2 s
Spectral range	310 to 2700 nm	310 to 2700 nm
Zero offsets: - (a) thermal radiation (at 200 W/m ²) (b) temperature change (5 K/h)	1 W/m ² 1 W/m ²	1 W/m ² 1 W/m ²
Non-linearity (100 to 1000W/m ²)	< 0.3%	< 0.3%
Field of view	5° ±0.2°	180°
Slope angle	1° ±0.2°	----
Measurement range	0 to 1500W/m ²	0 to 1500W/m ²
Operating temperature range	-40°C to +80°C	-40°C to +80°C
Ingress Protection (IP) rating	67	67
Temperature response	-----	< 1% (-20°C to +50°C)
Directional response (up to 80° with 1000 W/m ² beam)	-----	< 20W/m ²





SOLAR SYSTEM ANALYSER

This facility is capable of measuring the power generation of photovoltaic modules.

Instrument Details:

- ◆ 9018BT, Meco, India

Application:

- ◆ Measurement of open circuit voltage, short circuit current, fill factor and electrical efficiency of PV module

Technical Specifications:

Battery Type	Rechargeable Lithium Battery (3400mAh)
Battery Life	400 times of linear scan (1000V ~ 1V, 0.1A ~ 12A), 8 hours for standby mode
Memory Size	512K Bytes (3980 Mod files or 320 REC files or 3980 PWR files or 3980 IRR files)
AC Adaptor	AC 100 ~ 240V input, DC 15V / 1~3A output
Dimension	260 x 158 x 64mm (approx.)
Weight	1580 gm Batteries included (approx.)
Operation Environment	50 ~ 50 , 85% RH
Temperature	0.1% of full scale
Coefficient	(<18 or >28)
Storage Environment	-20 ~ 60 , 75% RH
0 ~ 1000V	$\pm 1\% \pm (1\% \text{ of } V_{oc} \pm 0.1 \text{ V})$
0.1 ~ 12A	$\pm 1\% \pm (1\% \text{ of } I_{sc} \pm 9\text{mA})$





BIPV TEST CHAMBER

Building-Integrated Photo-voltaic (BIPV) Chamber is Double skin facade system which can reduce the energy consumption of HVAC system by operating under different ventilation modes.

Applications:

BIPV system can be operated in different ventilation modes and air cavity width, depending upon different climatic conditions through which high energy savings upon energy consumption of HVAC system can be achieved.





HOT WIRE ANEMOMETER

This facility provides the flow of the fluid in chamber or the duct.

Instrument Details:

- ◆ SDL350, Extech, USA
- ◆ General Specification: Hot wire anemometer

Application:

- ◆ Measurement of mass flow rate of fluid and its temperature



Technical Specifications:

Specifications:- Air Velocity	Range	Resolution	Basic Accuracy
m/s	0.2 to 25 m/s	0.01 m/s	±5%
ft/min	40 to 3940 ft/min	1 ft/min	±5%
MPH	0.5 to 45 MPH	0.01 MPH	±5%



UNIVERSAL DATA LOGGER

This facility offers the measurement of temperature of surfaces. Different types of thermocouples such as K-type, J-type etc and RTD can be connected to this datalogger for precisely measurement of temperatures.

Instrument Details:

- ◆ 34972A, Keysight, USA
- ◆ General Specification: Universal data logger

Applications:

- ◆ Measurement and log the temperature of system





RADIATIVE AND CONDUCTIVE HEAT FLUX SENSORS AND DATA LOGGER

This facility are the radiative and conductive heat flux sensor which are used to attach on the inner side of indoor spacing of building. These sensors gives the amount of heat transfer into indoor spacing.

Instrument Details:

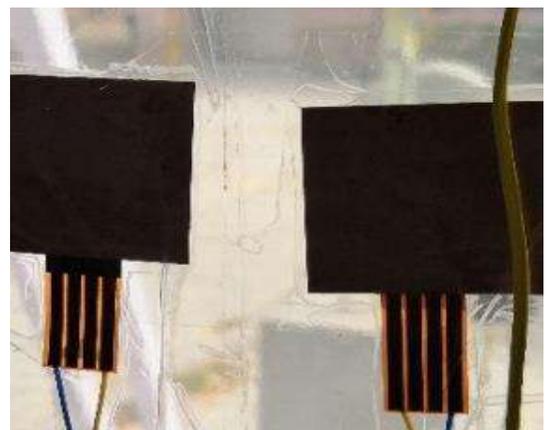
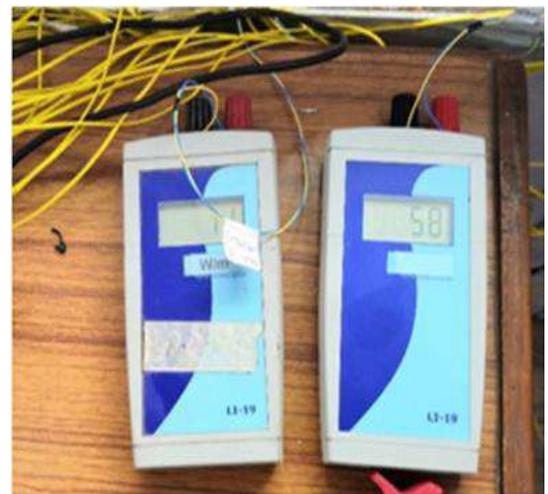
- ◆ ELAB-FMH , ELAB Solutions, French
- ◆ General Specification: Conductive and Radiative heat flux sensor with data logger

Application:

- ◆ Measurement of the conductive and radiative heat flux ingress into BIPV test chamber through windows

Technical Specifications:

- ◆ Response Time: ≤ 25 seconds.
- ◆ Sensitivity: Higher than $10 \mu\text{V}/\text{W}/\text{m}^2$
- ◆ Temperature range: -10°C to 100°C
- ◆ Sensor Thickness: Less than 1 mm
- ◆ Sensor area: Less than 50×50 mm





Softwares:

- ◆ ANSYS
- ◆ COMSOL Multiphysics
- ◆ PVSyst
- ◆ SPSS
- ◆ eQUEST
- ◆ SimaPro 8
- ◆ TRNSYS
- ◆ Transol
- ◆ DesignBuilder
- ◆ WAsP
- ◆ LabVIEW
- ◆ EnergyPlus
- ◆ MATLAB
- ◆ RETScreen

Contact Us:

Contact : +91-(0)141-271-3483

Email ID : hod.cee@mnit.ac.in



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Centre for Energy and Environment
Malaviya National Institute of Technology Jaipur