ENVIRONMENTAL ENGINEERING LAB

DEPARTMENT OF CIVIL ENGINEERING

Mahindra™ University
Global Thinkers. Engaged Leaders.

ÉCOLE CENTRALE
SCHOOL OF ENGINEERING

Environmental Engineering Laboratory

Environmental Engineering Laboratory analyses samples from environmental media (air, water, soil, and biota) as well as sources that release waste into the environment (such as industries, domestic and agricultural sources, automobiles, etc.). The main experiments are on testing the air pollution, water and wastewater quality parameters such as pH, Turbidity, Conductivity, Hardness, Phosphates, Nitrates, Chlorides, Sulphates, Alkalinity, BOD, COD, etc.

Ongoing research projects:

- Nature-based wastewater treatment (Wetland technologies & algal wastewater treatment)
- Recovery of value-added products from wastewater / solid waste (lignocellulosic waste)
- Different desalination technologies based on low-cost adsorbents.
- Development of the Decision-Making Indices for EHS Management System @API Industry

Research expertise available with the laboratory:

Dr. Keerthi Katam (Keerthi Katam | Mahindra University)

Some of the recent undergraduate project works performed in the laboratory:

- Application of Nano particles in reduction of environmental air pollution in concrete structures
- Life cycle assessment of concrete mixtures
- Machine Learning Strategies for Assessing Lake Health
- Investigating carbon capturing properties and self-healing of algal bio-concrete
- Application of Nanoparticles in reduction of environmental air pollution in concrete structures
- Monitoring and identifying micropollutants in Hyderabad groundwater
- Mapping noise pollution in Mahindra University
- Investigating the Effects of Nighttime Illumination on Sleep Patterns and Health
- Chemical Characterization and Risk Assessment of Pollutants in Personal Care Products
- Estimation of carbon footprint of social media apps like YouTube, Netflix, Instagram
- Exposure and Inhalation Risk Assessment of Pollutants in Personal Care Products
- Pre-treatment of solid waste (Sugarcane bagasse and Citrus peel waste) for recovery of value-added products
- Investigating the effect of environmental conditions on algal growth and lipids characterization

Equipment available in the Laboratory:

UV-Vis Spectrophotometer 2202 TS

- **Optics double beam with holographic diffraction plane grating (grating -1200mm lines/mm)**
- **10.1-inch multi-touch LCD with 1200 x 800 resolution**
- **Inbuilt smart station with windows 10 operating system, Bluetooth and Wi-Fi connectivity**
- **Wavelength range 190 nm to 1100 nm (1 nm bandwidth)**
- **Automatic baseline correction, lamp selection, sample position, stray light correction, dark correction, wavelength selection and order cut-off filter selection**

Deionized Water Unit

- **Model: Purelab chorus 2 Complete 20 L/hr**
- **Dispense Flowrate: >1.5 L/min**
- **Inorganics (resistivity at 25°C): 18.2 MΩ.cm**
- **Organics (TOC): <5 ppb**
- **Bacteria: <0.001 CFU/mL ***
- **Bacterial Endotoxin: <0.001 EU/mL ***
- **pH: Effectively Neutral**
- **Daily Usage (max): 480 L/day**

BOD Incubator

- **Temperature Range: 5 to 75 °C**
- **Frequency: 0 to 60 °C**
- **Material: Mild Steel Outer Inner S.S**
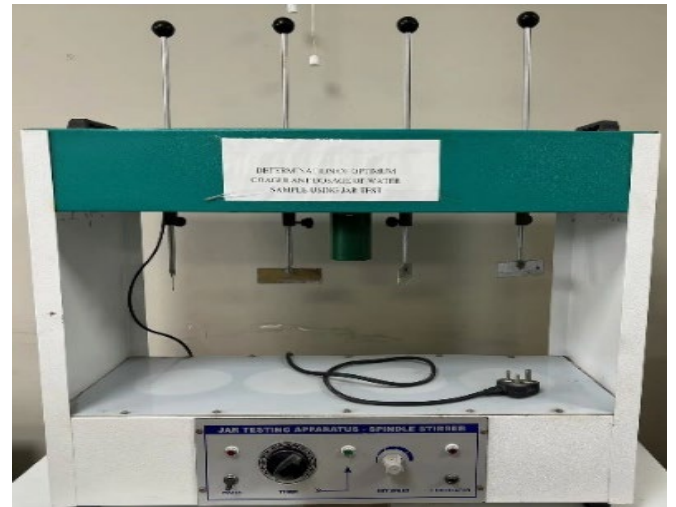- **Capacity: 3- 16 cubic feet**
- **Features: hot and cold**

Fume Hood (Mild Steel)

- **Model: RH-60-05**
- **Brand: Rescholar**
- **Size: 90x60x60 cm**
- **Granite Working Platform**
- **High Speed Centrifugal Blowers**
- **Front Sash with counter weights**
- **Fluorescent illumination lights**
- **Water tap and PP sink**
- **Provision for gas and air Connection Storage cup board**
- **15/5 Amp Switches and Socket**

Flocculator

- **Voltage: 220 Volts AC**
- **Speed: 20 R.P.M. to 120 R.P.M.**
- **Capacity: 1 litre to 2 litre**

COD digester (open reflux)

- **Display: Digital**
- **Material: Mild Steel Powder Coated**
- **Control: PID Controller**
- **Voltage: 220 / 230 AC**
- **Power Source: 220/230 V**
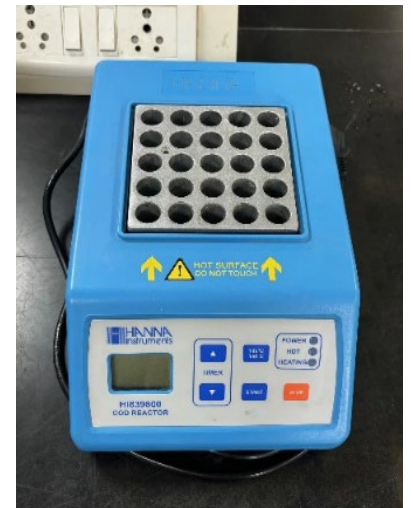- **Heat Temperature: 150º C**

Hot Air Oven

- **Display: Digital**
- **Temp. Range: 50 °C to 250 °C**
- **No. of trays: 4**
- **Capacity: 43 to 325 litre**
- **Voltage: 440V**
- **Frequency: 50 Hz**
- **Temp Accuracy: +/- 2 °C**

COD Digester (Closed Reflux)

- **Temperature of Reaction: 105°C or 150°C (221°F or 302°F)**
- **Temperature Stability: ±0.5°C**
- **Temperature Range: -10°C to 160°C**
- **Capacity: 25 vials (dia 16 x 100 mm)**

pH/TDS/EC/Salinity meter

- **pH Range: 0 to 14.00 pH**
- **Cell Constant: 1.0 C.C.**
- **Display: 240x128 Monochrome LCD**
- **Accuracy: +/-2% of F.S. +/-1 Digit**
- **Power: 230V AC+/-10%, 50Hz**
- **Dimension: W295xD300xH145 mm**
- **Calibration Points: 2, 3, 4 or 5**
- **Temperature Range: 0 to 99.9 °C with PT 100 Sensor**
- **Manual Temperature Range: 0 to 99.9 °C User Selectable**
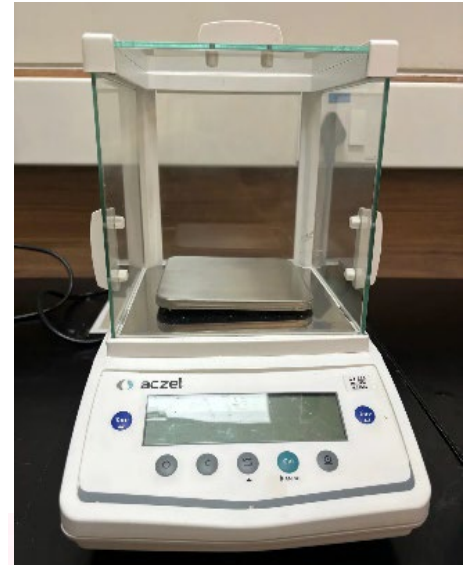- **Salinity Range: 0.1 to 40 ppt (More than Sea Water)**

Table Top Turbidity Meter

- **Measure Range: 1000 NTU**
- **Accuracy: +/- 4 % FS**
- **Temperature Range: 50 Degree Celsius**
- **Power Source: Electric**
- **Voltage: 220 V**
- **Frequency: 50 Hz**

Weighing Balance

- **Weighing Capacity: 200 G**
- **Calibration: Internal**
- **Type Of Weighing Scale: Digital**
- **Brand: Aczet**
- **Display Type: LCD Display**
- **Pan Size: 128X128mm**
- **Accuracy: 0.001g**
- **Automation Grade: Automatic**
- **Stabilization Time: 1 second**

Dissolved Oxygen Meter

- **Measuring Range DO: 0-20.00mg/L**
  O_2: 0- 200%
- **Resolution: 0.01 DO/0.1 O2 /0.1C**
- **Accuracy DO: +- 0.2 + 1 digit**
  O_2: +-2% FS/T: +- 0.2C

Air quality meter (Indoor)

- **Usage/Application: Indoor Air Quality**
- **Brand: Prana Air**
- **Accuracy: PM Accuracy: 0-150 ug/m^3 -/+ 10% and 150 ug/m3 and above -/+ 15%**
- **Dimension: 185 x 30 x 110 mm**
- **Hcho Test Range: 0 - 2 PPM**
- **Input: 5V DC Power Supply**
- **Tvoc Test Range: 0 - 20 PPM**
- **Features: Touch Screen, Mobile & Smart TV App Enabled through WiFi**

Portable multi gas analyzer (CO, CO_2, O_2, NO_x, SO_x)

- **Display: LCD**
- **Calibration Automatic Zero on Start with fresh air sample**
- **SPAN Calibration Automatic with calibration gas**
- **Response Time Maximum 20 seconds at 95% variation**
- **Power Supply Internal battery pack with external charger 220V / 50 Hz**
- **Working Temperature: -5 to 55°C**
- **Storage Temperature: -20 to 45°C**
- **External Dimension: 170 X 100 X 130 mm**
- **Weight: 1.5 kg**

Sound Level Meter and LUX meter

- **Display: LCD**
- **Measurement Range: 30-130 dB**
- **Response Time: 0.5 Seconds**
- **Temperature Range: 1300 ℃**
- **Data Hold Function**
- **High Resolution: 0.1 ℃/F (DT-302-1/2)**
- **High Stability, high accuracy: 0.2% (DT-302-1), 0.5% (DT-302-2)**

Water Bath Rectangular (Thermostatic Control) VT-166

- **Standard double wall construction, inner being stainless steel outer of mild steel**
- **Top cover: 75mm 6 holes with concentric rings.**
- **Temperature range: 5 ℃ above ambient to 95 ℃ controlled by a thermostat**
- **Heating accuracy: ±1℃**

Magnetic Stirrer with Hot Plate

- **Dimension: 165 (W) X 230 (L) X 110 (H)**
- **Maximum Stirring Quantity: 3000 ml water**
- **Rotation: 100 – 1500rpm**
- **Temperature Range: Up to 200 °C**
- **Power supply: 100~250 V AC, 50/60 Hz, 20 Watt**
- Material: Stainless steel

Remi Centrifuge Machine C 852

- **Capacity: 4 X 15 mL**
- **No. of Tubes: 4**
- **Max. RCF: 1750 g**
- **W X D X H: 295 x 295 x 25 mm**
- **Supply: 220-240 Volts, 50 Hz Single Phase.**
- **Max. Speed Range (RPM): 3500 RPM**

Muffle Furnace

- **Temperature: 1200°C**
- **Rated Power (KW): 3.5kW**
- **Temperature Accuracy: 0.3°C**
- **Automation Grade: Semi-Automatic**
- **Material Loading Capacity: 100kg**
- **Dimension: 12 X 6 X 6 inch**

Deep Fridge

- **Make: Haier HFC-400DM5**
- **Double Door Hard Top Deep Freezer,**
- **Capacity 383 litres**