ENVIRONMENTAL MONITORING AND REMEDIATION LAB

DEPARTMENT OF CIVIL ENGINEERING

Mahindra™ University
Global Thinkers. Engaged Leaders.

ÉCOLE CENTRALE SCHOOL OF ENGINEERING

ENVIRONMENTAL MONITORING AND REMEDIATION LAB

Environmental Monitoring and Remediation Lab is to assess and address environmental pollution and degradation by monitoring various environmental parameters such as air, water, soil, and ecosystems. The lab focuses on urban flooding detecting pollutants, analyzing environmental samples, and utilizing geospatial data to develop effective remediation strategies that restore and protect natural resources.

On-going 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
- Water quality monitoring in the Godavari River basin, which involves analysis of basic parameters, heavy metals, and micropollutant contamination in the region.
- Flood risk assessment for Godavari Basin using Geographic Information System.
- Assessing flood risk involves identifying high-risk areas, determining potential impacts on communities, infrastructure, and the environment, and quantifying economic losses.
- Develop accurate models to predict flooding in the river basin under various hydrological parameters.

Research expertise available with the laboratory:

Dr. Keerthi Katam (Keerthi Katam | Mahindra University)

Dr. Prabhakar Singh (Prabhakar Singh | Mahindra University)

Some of the recent works done:

- Forecasting Solid Waste Generation and Its Composition in Visakhapatnam: A Case Study at 4th International Conference on "Advanced Technologies for Industrial Pollution Control (ATIPC-2024)" IIEST Shibpur. Springer Proceedings of Earth and Environmental Sciences (SPEES). (Dec 17 to 19, 2024).
- Performance of polyculture vertical flow constructed wetland for campus greywater treatment at Challenges and Innovations for Sustainable Smart Cities (CISSC-2025). (Feb 7 to 9, 2025).
- A Review of EIA and EMP Quality and their Effectiveness for An Indian Active Pharmaceutical Ingredients (APIs) Industry at 4th International Conference on "Advanced Technologies for Industrial Pollution Control (ATIPC-2024)" IIEST Shibpur. Springer Proceedings of Earth and Environmental Sciences (SPEES). (Dec 17 to 19, 2024).
- Review on Environmental Impact Assessment (EIA) and Environmental Management Systems (EMS) in the Pharmaceutical Industry in 4th International Conference on Environmental Management (ICEM 2024) which was held on 4th to 7th October 2024, Hyderabad, India.

- Water Quality Distribution in Durgam Cheruvu Lake at 4th International Conference on “Advanced Technologies for Industrial Pollution Control (ATIPC-2024)” IIEST Shibpur. Springer Proceedings of Earth and Environmental Sciences (SPEES). (Dec 17 to 19, 2024).
- A Comparative Study on Seawater Desalination Using Low-cost Adsorbents: Multani Mitti, Marble Waste, Coconut Fiber, And Charcoal at Challenges and Innovations for Sustainable Smart Cities (CISSC-2025). (Feb 7 to 9, 2025).
- Tatavarthi, Pratyusha & Vemuri, Jayaprakash & Singh, Prabhakar. (2024). Reservoir Outflow Prediction Using Adaptive Neuro-Fuzzy Interface System. 10.21203/rs.3.rs-4288156/v1.
- Assessing Downstream Heavy Metal Contamination and Risks in the Godavari River Basin: Implications for Irrigation and Water Quality Management- Tatavarthi. P, Katam. K, Sharma P, Singh P (Accepted, Journal of Irrigation and Drainage Engineering)
- Kara, R., Singh, P. Flood assessment for Lower Godavari basin by using the application of GIS-based analytical hierarchy process. Int J Syst Assur Eng Manag (2024). https://doi.org/10.1007/s13198-024-02595-2

Equipments available in the Laboratory:

UV-Vis Spectrophotometer 2202 TS

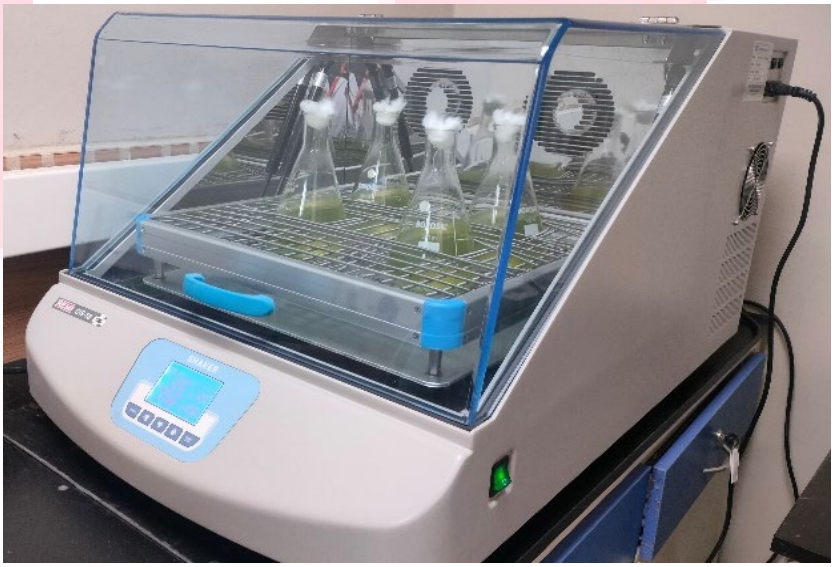
- Optics double beam with holographic diffraction plane grating (grating - 1200mm lines/mm)
- 10.1-inch multi-touch LCD with 1200x800 resolution
- Inbuilt smart station with windows 10 operating system
- Bluetooth and Wi-Fi connectivity
- 1 nm bandwidth
- Wavelength range 190 nm to 1100 nm
- Automatic 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
- Particles: 0.2 µm *
- Daily Usage (max): 480 L/day

Bench Top Orbital Shaking Incubator

- Model: CIS 18 plus
- Shaking Speed Range: 20-300rpm,
- Temperature Range: 4-50°C ±0.5°C
- Timer Range: 1hour- 99h:59m
- Platform Size (mm): 450 x 450
- Maximum Shaking Capacity: 4x2000ml, 8x1000ml, 11x500ml
- (No. of flasks x Volume): 12x250ml, 28x100ml, 42x50ml
- Load in Tray: 10 Kg



CPR-24 Plus Refrigerated Centrifuge

- Model Name/Number: C-24 Plus
- Brand: Remi
- Max. Speed: 20000 rpm
- Max. Capacity: 400 ml
- W x D x H: 775 x 575 x 475 (mm)
- Temperature range: -8°C to 40°C
- Rotors: R241M, R247MF, R248 M
- Safety features: It comes with safety features such as door interlock, imbalance cut-off, and over-speed protection.

BOD Incubator

- Chamber Volume: 250 Litre, 350 Litre, 400 litre
- Number of Shelves: 2 Shelves, 3 Shelves, 4 Shelves
- 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

Autoclave

- Portable Autoclave Six Wing Nut
- Capacity -35 Ltr.
- Material - Aluminium Hydraulically tested upto 40 PSI.

Ultrasonic Cleaner

- Display Mode: Digital
- Body Material: Stainless steel
- Max. Temperature: upto 60 °C
- Ultrasonic Frequency: 30 kHz
- Current Type: 220-240 V

Vortex Shaker

- Model: BHRMI 1.0
- Speed: 200 to 2800 rpm
- Orbital diameter: 4 mm
- Operational mode :0-999 min
- Display: LED with rpm & time
- Unit External Dimension (W x D x H) :(132x160 x180) mm

Vacuum Filtration Kit

- 100% Borosilicate Glass with fritted glass filter base. The base design has an integral vacuum connection located above the filtrate drip to prevent contamination of the vacuum line with droplets
- 1000ml Borosilicate Filtering Flask
- 300ml Buchner Funnel with Sintered Disk
- 47mm Filtration Base with Pushback Clamp
- Vacuum Pump single stage with high pressure, Capacity of 50L/min. for Laboratory Purpose

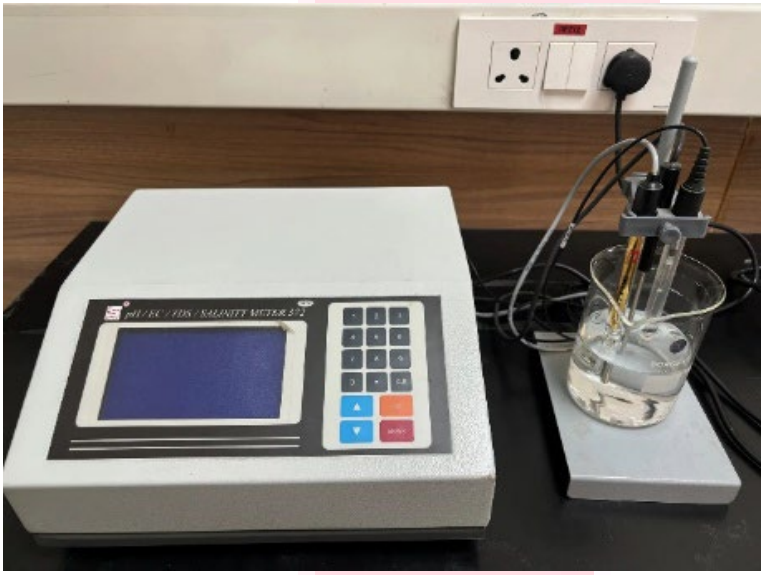
COD Digester (Closed Reflux)

- 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)

Overhead Stirrer

- Brand: Remi
- Model Number: RQ 122/D
- Fluid Type: Water
- Impeller Diameter: 38 mm
- Stirring Shaft Diameter: 6 mm
- Impeller Type: Pitched Fan
- Motor Type: AC/DC 1/20 HP
- Stirring Shaft * Length (mm): 250 mm
- Speed range (rpm): 800 - 4000 rpm
- Max. Stirring Capacity: 7 L

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)
- Repeatability: +/-0.01 pH+/-1 Digit
  Deviation of Buffer: +/-0.5 pH approx.
  Acceptable for Calibration

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

Portable Water Quality Meter

- Model: AD630
- Range: 0.00 to 45.00 ppm O_2
- Temperature: 0 °C to 50 °C / 32 to 122 °F
- Resolution: ppm/0.1% , 0.1°C/0.1°F
- Accuracy: (±1.5)% f.s. (DO), ±0.5°C/±1.0°F
- DO calibration: Automatic, at 1 or 2 standard points (0 and 100%) or 1 custom point (> 20%)
- Temperature Calibration: User offset adjustment
- Altitude Compensation: 0 to 4000 m (resolution 100 m)
- Salinity Compensation: 0.00 to 50.0 g/l (resolution 0.1 g/l)
- Log-on-demand: Up to 100 samples
- Dimensions / Weight: 188 * 96 * 70mm / 460

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

Air quality meter (Indoor)

- Usage/Application: Indoor Air Quality
- Brand: Prana Air
- Accuracy: PM Accuracy: 0-150 ug/m3 -/+ 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: 5ºC above ambient to 95ºC controlled by a thermostat.
- Heating accuracy: ±1ºC.

Heating Mantle

- Material: Glass Yarn
- Controller: Energy Regulator
- Size: 1000 ml, 500 ml, 250ml
- Voltage: 220V
- Wattage: 300 Watt

Software available in the Laboratory:

ArcGIS