Industrial Waste Simulations and Analytics

Mentors : Punam Singh
Madhav Lata

Project Overview

This project focuses on developing an industrial waste management system that integrates analytics, simulations, and optimization techniques. It is designed to address key challenges in waste generation, recycling, and valorization while ensuring environmental and economic sustainability.

The outcome includes predictive models, optimized processes, and a final report presenting insights, models, and strategies to drive sustainable waste management solutions.

Project Goals

01 Develop predictive models to forecast industrial waste generation and identify trends for better resource management

02 Optimize waste processes using material and energy balances to improve sustainability and efficiency

03 Evaluate recycling and valorization opportunities through environmental impact and cost-benefit analyses to propose feasible waste management solutions

Project Timeline

Week 1

Learn about industrial waste management and process flow diagrams (PFDs)

Week 2

Perform data collection, cleaning, and basic exploratory data analysis (EDA)

Week 3

Visualize waste trends using dashboards and identify insights

Week 4

Build a simple predictive model for waste generation

Project Timeline

Week 5
Mid-Term Evaluation

Week 6
Fine-tune and evaluate the predictive model for accuracy

Week 7
Optimize material and energy balances for waste reduction

Week 8
Explore recycling and waste valorization methods with feasibility analysis

Project Timeline

Week 9

Conduct environmental impact assessments (e.g., carbon footprint, LCA)

Week 10

Perform cost-benefit analysis for process improvements

Week 11

Finalize optimization and feasibility reports with feedback

Week 12

End Term Evaluation

Logistics

Tentative Duration	11-12 weeks
Weekly Commitment	5-6 hours/week
Mode	Offline Classes at FB463
Assignments	Weekly + Final assignment
Software Frameworks	Python libraries, Power BI, Matlab, Aspen, OpenLCA

CONTACT

Punam Singh

+91 7878472073
punamsingh22@iitk.ac.in

Madhav Lata

+91 6375108761
madhavlata22@iitk.ac.in