Pulkit Bhardwaj

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Academic Qualifications

Year	Degree/Certificate	Institute	CPI/%
2023-2027	B.Tech-Chemical Engineering	Indian Institute of Technology Kanpur	7/10
2023	CBSE(XII)	Dev Samaj Vidya Niketan School, Gurgaon	94.4%
2021	CBSE(X)	Dev Samaj Vidya Niketan School, Gurgaon	93.2%

Scholastic Achievements

- Earned **Bronze Level** recognition in the **WorldQuant Challenge** for applying predictive modeling techniques *2024*
- Secured **All India Rank 5649** in JEE Advanced 2023 among the **1.9 Lakh** shortlisted candidates across India *2023*

Work Experience

Optimizing DELM via Small-World | Winter Intern
Mentor: **Prof. R.M. Hegde, Dept. of Electrical Engineering**, IIT Kanpur *(Nov'24 - Jan'25)*

Objective	• Developed a **high-speed** DELM model as a **scalable** alternative to backpropagation-based neural networks
Approach	• Implemented **small-world architecture** with randomized **inter-layer** connections to boost model efficiency • Enhanced accuracy via **optimal node selection** using **weight analysis** and **activation value analysis** • Experimented with **learning methods**, number of nodes and implemented **iterative weight storage** solution
Impact	• Achieved **100% stability** on Concrete dataset with **15x lower training time** and reduced RMSE compared to traditional backpropagation models; delivered similar results on **Parkinson and Energy** datasets

Key Projects

Industrial Waste Simulations | Chemineers | **Dept. of Chemical Engineering**, IIT Kanpur *(Jan'25 - Apr'25)*

Objective	• Developed a data-driven system to analyze and forecast industrial waste management for **sustainable** operations
Approach	• Built predictive models and dashboards using **Python and Power BI** to identify waste generation patterns • Conducted **Life Cycle Assessment**(**OpenLCA**) and cost-benefit analysis to evaluate recycling strategies
Results	• Proposed actionable waste management solution; improved **sustainability** and **reduced** projected **waste** load

Charcoal Reuse | CHE213 | Prof. Himanshu Sharma | **Dept. of Chemical Engineering**, IIT Kanpur (*Jan'25 - Apr'25*)

Objective	• Developed a cost-effective method to **regenerate** used charcoal for **repeated adsorption** applications
Approach	• Conducted lab-scale trials with chemical treatments (**HCl, NaOH, oxalic acid**) to restore adsorption capacity • Validated HCl as the optimal regenerant and **scaled** the process to full lab setup for performance testing
Impact	• Achieved **3–4 reuse** cycles with comparable efficiency to fresh charcoal, reducing charcoal consumption by 75%

Surfactant Feasibility | CHE261 | Prof. R. Ragipani | **Dept. of Chemical Engineering**, IIT Kanpur *(Jan'25 - Apr'25)*

- Recommended green synthesis routes (enzyme-catalyzed FAEs, direct amidation) based on yield, safety, and scalability
- Proposed optimized LABS production pathway with **90%** selectivity using **zeolite alkylation** and SO3 sulfonation

Methanol Synthesis | CHE251 | Prof. S. Sivakumar | **Dept. of Chemical Engineering**, IIT Kanpur *(Sep'24 - Nov'24)*

- Simulated methanol synthesis using **Aspen Plus**, optimizing reactor conditions for maximum CO/CO2 conversion
- Achieved **35%** CO and **17%** CO2 conversion with energy savings through heat recovery and process integration
- Identified **optimal** operating window (220–280 C, 55 atm) to balance methanol yield, catalyst life, and energy efficiency

Natural Convection | CHE212 | Prof. A. Tripathi | **Dept. of Chemical Engineering**, IIT Kanpur (*Jan'25 - Apr'25*)

- Identified and corrected major design/calculation flaws (e.g., cylinder orientation, power factor, unaccounted heat losses)
- Reduced experimental error from **300% to 100%** by improving setup, sensor placement, and heat transfer calculations

Technical Skills

Programming Languages	Simulation & Process Design Tools	Libraries
MATLAB, Python, C, C++, SQL	Aspen Plus, DWSIM, AutoCAD	Numpy, Pandas, Matplotlib, Plotly, Keras

Relevant Courses

Chemical Thermodynamics	Fluid Mechanics and Rate Processes	Process Calculation
Heat Transfer	Mass Transfer and Separation Processes	Chemical Process Industries

Positions of Responsibility

Core Team Member, Chemineers Society | Dept. of Chemical Engineering, IIT Kanpur (*Apr'25 - Present*)

Leadership	• Leading a **three-tier** team of **40+** to drive academic, skill-based and cultural growth for **700+ students**
Management	• Managing **INR 7.2 Lakh** budget, targeting **INR 10+ Lakh** this year ensuring efficient resource allocation • Recruited **15 secretaries** out of multiple application received through **two-stage** elimination process
Intiative	• Led initiatives like **Intern Marathons**, **alumni talks**, and fresher sessions, enhancing career readiness • Collaborated with **10 IITs** to organise ChemBlitz, an **inter-IIT** E-sports Tournament featuring 6 games