JED MATANGI

CHEMICAL ENGINEER (UJ) | PRODUCT DEVELOPMENT AND DESIGN

EDUCATION

University of Johannesburg (UJ)
Bachelor of Engineering – Chemical Engineering
2025

Relevant Coursework:
Chemical Reaction Engineering, Process Design, Separation Processes, Thermodynamics, Process Control, Fluid Mechanics, Heat and Mass Transfer, Engineering Design

ENGINEERING EXPERIENCE & PROJECTS

Independent Hardware & Product Development
2022 – Present

- Designed and built multiple functional hardware prototypes using ESP32, Arduino, and 3D printing for real-world applications
- Developed an ESP32-based automated pet feeder with Wi-Fi control, servo-driven dispensing, lithium-ion power system, and web-based user interface
- Designed and manufactured custom enclosures and mechanical components using Fusion 360 and 3D printing for electronics integration
- Built custom lithium-ion power bank systems with spot-welded battery packs, protection circuitry, and 3D printed housings
- Designed and prototyped hygiene and home products including modular toothbrush holders focused on airflow, drying, and daily usability
- Applied iterative design workflows: concept to CAD to prototype to test to redesign
- Documented builds through engineering-style breakdowns, testing notes, and versioned improvements

BIODIESEL FROM WASTE-COOKING-OIL

Chemical Engineering Project
Oct 2025 – Dec 2025

- Conducted experimental testing on catalyst concentration, mixing time, temperature, and methanol ratios
- Identified and mitigated soap formation (saponification) through controlled processing conditions
- Implemented methanol removal through controlled heating to improve phase separation and fuel clarity
- Developed repeatable batch methodology for consistent fuel quality
- Performed burn tests and visual quality analysis on final fuel product

CONTACT ME

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TECHNICAL SKILLS

DESIGN & CAD
Fusion 360, Blender, SolidWorks (working knowledge), technical drawing, design for prototyping and manufacture

ELECTRONICS & EMBEDDED SYSTEMS
ESP32, Arduino, sensors, servos, relays, lithium-ion power systems, battery management, power modules

MANUFACTURING & PROTOTYPING
3D printing (Carbon Fiber, Nylon, PLA, PETG, ASA), laser engraving, basic CNC workflows, enclosure design, mechanical integration

SOFTWARE & PROGRAMMING
Arduino C++, basic Python, embedded systems logic, web-based microcontroller interfaces

ENGINEERING METHODS
Experimental testing, process optimisation, mass balances, reaction engineering, separa tion processes

ADDITIONAL INFORMATION

- Strong focus on building real, working engineering systems from concept to prototype
- Hands-on approach to learning through design, fabrication, and testing
- Experience documenting engineering builds for technical and educational audiences
- Interested in product development, hardware engineering, automation, and applied R&D
- Passionate about accessible engineering solutions and practical innovation

LAB AND PROCESSING EQUIPEMENT

Design Projects

2025

- Designed and built a benchtop bioreactor system using a 775 DC motor, heating element, thermocouple, and agitation system
- Designed modular lab equipment components for experimental setups using CAD and rapid prototyping
- Built sensor-driven systems for monitoring temperature and process variables
- Developed control logic using microcontrollers for automation and data acquisition