ALI NASERDDINE

Mechanical & Mechatronics Engineering Student (Robotics / Controls)
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SUMMARY

Mechanical Engineering student (Saint Joseph University of Beirut—USJ, Expected 2028) bridging hardware and software through robotics, control systems, and embedded development. Built project work spanning EKF-based IMU sensor fusion, industrial CAD assemblies (140+ parts), and state-estimation/control implementations; experience includes robotics instruction and industrial HVAC / NFPA-20 compliance exposure.

TECHNICAL SKILLS

- **Robotics & Estimation:** Extended Kalman Filter (EKF), SLAM, Forward/Inverse Kinematics
- **Control & Embedded:** PID tuning, Root Locus, PWM, Interrupt Service Routines (ISR), Microprocessors (ARM/AVR), Arduino, Micro:bit
- **Mechanical Design:** SolidWorks (advanced assemblies/simulation), ISO standards, HVAC systems, MEMS design concepts (DRIE/SOG)
- **Software:** Python (NumPy, TensorFlow), C++, MATLAB/Simulink

TECHNICAL PROJECTS

9-DOF IMU Sensor Fusion + MEMS IMU Design (Conceptual/Academic Project) | MATLAB, MEMS theory

- Designed a conceptual 9-DOF IMU architecture integrating accelerometers, gyroscopes, and magnetometers, including process-flow considerations (SOG/DRIE).
- Implemented an EKF to fuse non-linear sensor data and reduced orientation error to **<5° RMS** under dynamic conditions.
- Evaluated packaging/quality-factor trade-offs to support lower noise and improved signal quality.

Industrial 5-DOF Robotic Arm | SolidWorks, ISO standards

- Engineered a **140+ part** industrial manipulator assembly with interference-free integration and ISO-oriented safety considerations.
- Validated concept through kinematic simulation and joint torque analysis.

Autonomous Mobile Manipulation | Python, CoppeliaSim

- Derived kinematics for a KUKA youBot using Screw Theory and Product of Exponentials (PoE).

- Developed omnidirectional motion-control logic to execute mobile manipulation tasks in simulation.

Microprocessor Thermal Control System | Embedded C

- Built a real-time cooling system using interrupt-driven sensing and PWM motor control.
- Tuned a closed-loop PID controller to regulate temperature with minimal steady-state error.

EXPERIENCE

J-Tech Academy — Robotics & Coding Instructor | 2022 – 2025

- Taught robotics, Python, and C++ to **100+ students**; led development of autonomous sensor-based robots.

Middle East Airport Services (MEAS) — Mechanical Engineering Intern | Jun 2025 – Aug 2025

- Supported HVAC optimization work through psychrometric analysis and VFD tuning activities.
- Supported pump and fire-safety commissioning activities aligned with **NFPA-20** compliance requirements.

EDUCATION

Saint Joseph University of Beirut (USJ) — B.E. Mechanical Engineering | Expected 2028

- Focus: Mechatronics, Linear Control, Embedded C, Systems Analysis.

CERTIFICATIONS (COURSERA)

- **Modern Robotics (Northwestern University):** Kinematics, Dynamics, Motion. Planning
- **AI for Mechanical Engineers:** Neural Networks, Reinforcement Learning.