Omar Alhalawani

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Education

Bachelor of Engineering in Computer Systems — Ottawa, ON
Carleton University — CGPA: 11.57/12 — *Expected 2029*

- Ontario Professional Engineers Scholarship — Dean's Honour List

Experience

Engineering Office & Laboratory Assistant — Sept. 2025 – Present
Carleton University - Civil & Environmental Engineering — *Ottawa, ON*

- Developed the Mini-Lysimeter Research GUI, a Python system integrating NI-DAQ (9219) and Arduino at 100 Hz for soil mechanics experiments.
- Built a multithreaded Tkinter/Matplotlib interface with synchronized multi-sensor views, dynamic graphs, and automated workflows.
- Implemented timestamped autosaving pipelines with configurable intervals for continuous, zero-loss long-term logging.
- Maintained and repaired lab desktops/servers; deployed Linux systems and built internal hardware inventory tools.

Teaching Assistant - ECOR 1031 — Sept. 2025 – Present
Carleton University - Engineering & Design — *Ottawa, ON*

- Instructed 150+ students in Python labs on Linux/Ubuntu, reinforcing debugging strategies, modular software design, and algorithmic reasoning.
- Provided structured evaluation and feedback that improved average lab completion rates by 12%.

Founder & Repair Technician — Aug. 2022 – Present
Alhalawani Tech Solutions — *Ottawa, ON*

- Repaired and optimized 200+ devices using micro-soldering, PCB rework, and embedded diagnostics to restore full hardware functionality.
- Streamlined diagnostic workflows and automated repair-tracking processes, reducing turnaround time by approximately 40%.
- Maintained long-term client retention through consistent repair quality, documentation, and transparent communication.

Projects

BCD to 7-Segment Decoder (repo) — *Verilog, Logisim, Vivado — 2025*

- Designed a BCD-to-7-segment decoder using Boolean minimization and K-map simplification for efficient hardware logic.
- Simulated and verified correct output for digits 0–9 using structured testbenches in Logisim and Vivado.
- Built Verilog modules, constraint files, and TCL automation scripts, synthesizing the system onto Blackboard FPGA hardware.
- Debugged pin mappings and timing behavior to ensure stable and accurate hardware illumination.

Curve Fitting & Data Visualization App (repo) — *Python, NumPy — 2025*

- Developed regression and visualization tools for engineering datasets with automated plot generation.
- Implemented TextUI/BatchUI interaction modes, reducing manual input time by 70%.
- Integrated polynomial fitting, histogram modules, and file-based data handling.
- Authored documentation and demo material for usability and reproducibility.

Wireless IoT-Controlled Robotic Car (repo) — *C++, Arduino, Blynk IoT — 2024*

- Built a wireless IoT robotic car for safe remote inspection of hazardous or confined environments.
- Integrated Arduino with Blynk IoT for smartphone control and low-latency telemetry, reducing delay by 35%.
- Designed a vibration-resistant 3D chassis in AutoCAD to improve structural stability and sensor performance.
- Validated obstacle response, range reliability up to 15 m, and consistent control precision across varied test conditions.

Extracurricular Involvement

Carleton Planetary Robotics Team (CPRT) - FPGA Subteam — *2025 – Present*

- Developing Verilog modules and FPGA logic for rover subsystems in URC/CIRC competitions with a 50+ member team.

Biomedical Carleton Applied Research and Engineering (BioCARE) - Software Team — *2025 – Present*

- Supporting interdisciplinary biomedical design and research projects with engineering and life-science teams.

CUMSA - Vice President of Administration — *2024 – Present*

- Overseeing technical operations for a 500+ student organization, managing the website, Discord systems, and automations.

Technical Skills

Programming: C, C++, Python, Verilog, Bash
Embedded/Hardware: SPI, I^2C, UART, PWM, GPIO, ADC/DAC, Arduino/AVR, FPGA (ModelSim, Vivado)
Tools & CAD: Linux/Ubuntu, Git, Make/CMake, Oscilloscope, Soldering, AutoCAD, Inventor, Blynk IoT