

Talha Ahmad

Toronto, Ontario

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Education

McMaster University, B.Eng. Mechatronics Engineering 2023–2027

CGPA: 10.2/12.0 (3.7/4.0) | Dean's Honour List 2024 and 2025

Relevant Coursework: Embedded Systems Design, Data Structures & Algorithms, Analog & Digital Circuits, Electronics & Instrumentation

Experience

Embedded Systems Engineer Intern, Taylor Systems, Mississauga, Ontario May–Aug 2025

- Redesigned Modbus RS-485 hardware to extend communication range and improve acquisition success from 83% to 98%.
- Programmed I²C, UART, and GPIO on ESP32/Arduino in C++ to support 20+ real-time sensors with sub-50 ms latency.
- Built an MQTT data pipeline to simulate live telemetry to a Prometheus backend.
- Designed custom PCBs in KiCad for RS-485 primary and secondary boards.

Controls Engineer, McMaster Rocketry Team, Hamilton, Ontario Sept 2024–Present

- Designed and routed a custom STM32-based PCB in KiCad for data acquisition and CAN communication.
- Developed STM32CubeIDE firmware for sensor interfacing and avionics telemetry.
- Contributed to mechanical design using Onshape for avionics bay integration.
- Helped the team secure a 1st place payload finish and 3rd overall at Launch Canada 2025.

Math Instructor, Mathnasium of Milton, Milton, Ontario May 2025–Present

- Taught math to 40+ students (Grades 8–12), improving assessment scores by an average of 18%.
- Delivered personalized instruction using the Mathnasium Method across multiple different learning styles and profiles.
- Created custom learning plans aligned with Ontario curriculum expectations for multiple different students.
- Mentored advanced students on topics related to calculus, linear algebra, and competition-level math.

Projects

VisionNode | ESP32-CAM, STM32, Edge Impulse, TensorFlow Lite, MbedOS

- Built a real-time facial recognition system using an ESP32-CAM for imaging and an STM32 for control/display.
- Trained and deployed lightweight ML models using Edge Impulse and TensorFlow Lite.
- Integrated I²C and UART communication between camera module and controller.

Self-Balancing Robot | ESP32, MPU6050, Fusion 360, PID Control

- Designed and 3D printed a two-wheel self-balancing robot in Fusion 360.
- Implemented a PID control loop using MPU6050 IMU feedback for stabilization.
- Tuned PID gains through testing and logged system behavior via UART to achieve sub-5° error.

Digital Counter Display | JK Flip-Flops, 7-Segment, Multisim

- Designed a sequential logic circuit using JK flip-flops and multiplexers to iterate through a student ID.
- Wired and debugged timing logic to maintain stable transitions on a 7-segment display.

Technical Skills

Programming: C, C++, Python, MATLAB, Java, Rust

Hardware: ESP32, STM32, PCB Design (KiCad, Altium), FreeRTOS, MbedOS

Tools: Fusion 360, Inventor, Onshape, Git, Docker, Linux, VS Code, Soldering, Oscilloscope Debugging