Furqaan Khurram | Embedded Engineering Intern

furqaankhurram@gmail.com | +1 (647)-993-4040 | LinkedIn | Toronto, ON

EDUCATION

McMaster University | *B.Eng. Mechatronics Engineering (Co-op)*

- **GPA: 3.93/4.00** | ***Deans' Honour List***

Relevant Coursework: Analog and Digital Circuits **|** Embedded Systems **|** Data Structures And Algorithms **|** Signals and Systems

SKILLS

Programming and Scripting: C, C++, Python, Matlab, Java, Verilog, Git, Jupyter Notebook
Hardware & Tools: ARM Cortex-M (STM32/ESP32), Arduino, Circuit Design, Multimeter, Oscilloscope, Logic Analyzer, Soldering
Embedded Systems: Mbed OS, RTOS, Peripheral Interfaces (UART, SPI, I2C), MCU Architecture, Debugging & Testing
Simulation and Design Software: ModelSim, LTSpice, KiCAD, Autodesk Inventor, SolidWorks, Jira, Keil Studio
Operating Systems: Microsoft Windows, Linux (Ubuntu), MacOS

EXPERIENCE

Engineering Computing Teaching Assistant — **Hamilton, Ontario**
McMaster Engineering Faculty — *Sep 2025 – Current*

- Instructed **Python** and computing fundamentals via Jupyter Notebook and in-person labs.
- Supported 30+ students in understanding file I/O, conditionals, loops, and **object-oriented programming**

Joints and Actuation Team Member — **Hamilton, Ontario**
McMaster Exoskeleton — *Oct 2024 – Current*

- Developed a cycloidal gear drive in **SolidWorks** for hip joint to maximize torque-to-weight ratio.
- Collaborated on **embedded feedback loop design** including motor control, sensors, and actuator interfacing.

PROJECTS

ServeSim - Automated Volleyball Launcher (Hack the North) — **Waterloo, Ontario**
Arduino, C++, Stepper/ Hobby Servo modules, ESC & Motor Drivers, Circuit Integration, Local Web UI — *Sep 2025*

- Developed **C++ firmware** for stepper, servo, and **ESC-BLDC motors**, providing 3-DOF control and power adjustment
- Implemented spin and trajectory profiles (top/side/power) with **real-time motor synchronization** for consistent serves
- Built and integrated **custom circuitry for motor drivers and ESCs**, handling power delivery, protection, and reliable **multi-motor control**

Automated Wrestling Scoring System — **Mississauga, Ontario**
ESP32, Python, OpenCV, Bluetooth, Embedded C++ — *Jun 2025 - Jul 2025*

- Designed a **real-time embedded hardware interface** with sub-50 ms response using **Bluetooth** and LED matrix
- Collected and labeled over 5,000 video frames using **Python** (**OpenCV)** to build a dataset for move recognition
- Designed a modular preprocessing pipeline achieving **~85% test accuracy** on preliminary move detection tasks
- Demonstrated low-latency **wireless transmission** and **device-to-software integration**

RFID Escape Room Game — **Mississauga, Ontario**
C++, STM32, RTOS, Arduino, UART, RFID (RC522), Logic Design — *Apr 2025*

- Designed and built a 4-puzzle **Arduino RFID** escape room game demoed to 18+ participants, showcasing **embedded systems integration** and **real-time control**
- Implemented **UART communication** between **STM32 (RTOS)** and **Arduino** for synchronized states and sensor feedback
- Integrated 5+ **interactive hardware components** into a cohesive system with **modular peripheral control**
- Debugged **embedded C++ firmware** and logic across both microcontrollers resolving various embedded issues

7 -Segment Display and Decoder with Sequential Logic Design — **Hamilton, Ontario**
LTSpice, Logic Design, 74-series ICs, Oscilloscopes — *Mar 2025*

- Designed and implemented a **sequential logic circuit** using **flip-flops, finite state machines, and 74-series ICs** to drive a 7-segment display for real-time output
- Simulated signal behavior in **LTSpice** and validated design using **scopes and multimeters**

LEADERSHIP & ACTIVITIES

Matmen Wrestling Club Assistant Coach | U-20 Provincial Medalist | Army Cadet Service Medal Recipient