

SYSC 4907 M5
Design and Development of a Refreshable Braille Display



Group size: 3 or 4 students.

Suitable for: Students with interest in mechatronic systems, electromagnetism, programming, Electrical Engineering, Biomedical Engineering, Computer Systems Engineering, and Software Engineering students. A multidisciplinary team with students from different programs is preferred.

Desired background: Mechatronics, programming, CAD, embedded systems, software engineering.

Supervisor: Prof. C. Rossa: carlosrossa@cunet.carleton.ca

Lab information: <https://www.biomechatronics.ca>

Before joining the project, please form a group of 3 or 4 students and contact Prof. Rossa by email. Approval is required before joining the project.

Project Description: This project will create a refreshable Braille display that enables visually impaired users to access dynamic text content in real-time. Students will design an electromechanical system based on an array of miniature actuators, such as pins, that can be selectively raised and lowered to form Braille characters. The mechanical design will ensure precise movement to allow smooth reading by touch. The project also involves developing the electronic control system that drives the actuators, including power electronics, timing circuits, and signal processing. Students will create a software interface that connects the Braille display to a digital text source, allowing digital text to be displayed as tactile Braille outputs. This project requires a multidisciplinary team and approach, integrating mechanical design, electronics, embedded systems, and software. Students will engage in prototyping, testing, and iterative design to optimize the display for speed, accuracy, and usability. By the end of the project, students will have produced a functional prototype while gaining hands-on experience in accessible technology development and mechatronic system design.

Anticipated deliverables: A functional actuated prototype that can display a limited number of characters and communicate with digital text sources.