

INSTRUCTOR: Jay Brodeur, brodeuji@mcmaster.ca, Mills Library, Rm L104B

Course Description:

Electronic devices are a vital part of our modern lives, as they enable (or at least mediate) most of our personal and academic activities. Despite this key role, many of us have little understanding of how such devices actually work and would benefit greatly from an improved electronic fluency. In response, this course will use a collaborative, hands-on approach to introduce students to the fundamentals of electronics.

The development and widespread availability of inexpensive, user-friendly and well-documented electronics -- such as the Arduino -- has made learning and developing these skills accessible (and dare we say, even fun) for students of every age. Such resources now make it possible for even the most inexperienced student to create with electronics, while simultaneously reaping the educational benefits associated with the application of logic and rules to make cool stuff.

In this two-day "boot camp" experience, students will learn the basics of electronics by building simple circuits that integrate Arduino microcontrollers with various sensors and actuators. By developing software code to control the devices, participants will also gain experience with programming. Students will consolidate their learning by building a unique device capable of sensing changes in its environments and responding accordingly, as well as completing a blog post to describe their creation and reflect on their experience.

Learning Objectives:

Through participation in the course, students will develop a number of knowledge- and skill-based competencies. By the end of this course, students will be able to:

- Explain the fundamental concepts and operational principles of simple circuits, sensors and actuators;
- apply fundamental principles to build simple circuits that interact with their surrounding environments;
- modify and create software code to control the device's functionality; and,
- apply their skills, knowledge and creativity in the process of creating an original electronic device.

Course Schedule: / Class Activities:

Date	Time	Location
Friday, 2-Nov, 2018	1730 – 2100	Thode Library Makerspace (in the lower level)
Saturday, 3-Nov, 2018	0900 - 1600	Thode Library Makerspace (in the lower level)

Office Hours:

By appointment, as needed.

Required Texts & Materials:

Though not required, students will be encouraged to bring a personal laptop computer for use in the workshop.

Deliverables:

The class will be graded on a pass/fail basis. There will be a total of four evaluation components; all components must be passed in order to pass the course.

- Under instructor guidance and working in pairs, students will learn the fundamentals by building a number of diverse and increasingly complex electronic devices.
- Working in pairs, students will apply their fundamental knowledge to build a working device of their own design. At the end of the course, groups will present their final device, and discuss the challenges they faced in its development. Outcomes of this activity will be evaluated according to the creativity of the device, its degree of difficulty, and the ingenuity applied to create it.
- Groups will be required to document their project by sharing their commented, working code to [Github](#).
- Each group will complete a short summary and reflection in the form of a blog post (with at least one video of the working device included). With the students' permission, the blog post will be displayed publicly. The post will provide groups a means of documenting final products, and reflecting on their work and learning in the course. Blog posts will be evaluated according to completeness and depth of reflection.

GENERAL INFORMATION

A reminder that this course is PASS or FAIL. You are responsible for participating in all aspects of the module and absences or missed work could result in grade penalties.

Absences & Missed Work:

If you are absent from the university for a minor medical reason, lasting up to 3 calendar days, you may report your absence, once per term, without documentation, using the McMaster Student Absence Form (MSAF). Absences for a longer duration or for other reasons must be reported to your Faculty office, with documentation, and relief from term work may not necessarily be granted. When using the MSAF, report your absence to course instructor or designate. You must then contact the instructor/instructional assistant/other immediately (normally within 2 working days) by email. Please refer to the contact list on the first page of this outline for appropriate email addresses. The instructor/instructional assistant will indicate what relief may be granted for the work you have missed, and relevant details such as revised deadlines, or time and location of a make-up exam/quiz/test. Please note that the MSAF may not be used for final deliverables, nor can it be used for a final examination or its equivalent.

Checking Your Grades:

All grade concerns and discrepancies must be reported to the Instructor within a week of receiving the grade.

Communication between Students and the Instructional Team:

Any e-mails addressed to faculty must have a brief, relevant subject line, must come from a mcmaster.ca e-mail account and must copy in all relevant parties (e.g. other markers, other group members). All e-mail communication addressed to students will be sent to their mcmaster.ca e-mail account.

Work that is late, handed in to the wrong person, inadequately identified, or in the wrong format, risks losing marks.

Instructors will endeavor to return marked materials within two weeks of hand-in.

Student Responsibilities:

To get the most out of the course, you must be prepared to:

- attend all sessions, make up all missed work, and provide documentation for authorized absences;
- interact frequently with faculty, students, TAs, and other support staff;
- plan and manage your own time;
- complete preparatory tasks (such as reading, writing assignments, and initial research) in advance of sessions;
- develop and use reflective learning skills (for example identifying learning objectives, planning and carrying out research tasks, acting on academic feedback);
- work as an effective, efficient, and responsive team member on group assignments;
- follow all the guidelines as outlined in the Introduction section of the Laboratory Manual;
- check the course Avenue site, and your McMaster and Avenue e-mail daily for updates; and,

- follow all university policies and guidelines, and in all ways be a responsible university member.

Senate Student Policies

Students can view full policies here (<http://www.mcmaster.ca/policy/Students-AcademicStudies/>).

Senate Policy Statements are also available from the Senate Secretariat Office, Room 104, and Gilmour Hall.

Academic Integrity - <http://www.mcmaster.ca/policy/Students-AcademicStudies/AcademicIntegrity.pdf>

Academic dishonesty consists of misrepresentation by deception or by other fraudulent means and can result in serious consequences, e.g. the grade of zero on an assignment, loss of credit with a notation on the transcript (notation reads: "Grade of F assigned for academic dishonesty"), and/or suspension or expulsion from the university. It is your responsibility to understand what constitutes academic dishonesty.

The following illustrate only four of many forms of academic dishonesty:

- plagiarism, e.g. the submission of work that is not one's own or for which other credit has been obtained;
- copying or using unauthorized aids in laboratory exercises
- improper collaboration in group work; and
- copying or using unauthorized aids in quizzes, tests and examinations

All students are reminded of the importance of academic integrity, and the serious consequences of academic dishonesty.

Student Code of Conduct - [https://www.mcmaster.ca/policy/Students-AcademicStudies/Code of Student Rights and Responsibilities.pdf](https://www.mcmaster.ca/policy/Students-AcademicStudies/Code_of_Student_Rights_and_Responsibilities.pdf)

You acknowledge that your behavior in all aspects of this course should meet the standards of the McMaster University Student Code of Conduct. You understand that any inappropriate behavior directed against any of your colleagues, teaching assistants, or the instructional team will not be tolerated. Disruptive behavior during any session (e.g. lecture, seminar, lab, tutorial) such as talking, sleeping or non-class computing while an individual presents information, or constantly being late, will also not be tolerated. Abuse, ridicule, slander, inappropriate language, and discrimination towards instructors teaching staff, teaching assistants and other students will not be tolerated in any capacity. Shared spaces including e-spaces such as the Avenue to Learn course discussion board are to be considered inclusive and safe.

Plagiarism Detection

In this course, we will be using a web-based service (Turnitin.com) to reveal plagiarism. Students will be expected to submit their work electronically to Turnitin.com and in hard copy so that it can be checked for academic dishonesty. Students who do not wish to submit their work to Turnitin.com must still submit a copy to the instructor. No penalty will be assigned to a student who does not submit work to Turnitin.com. All submitted work is subject to normal verification that standards of academic integrity have been upheld (e.g., on-line search, etc.). To see the Turnitin.com Policy, please go to

<https://www.mcmaster.ca/academicintegrity/>

<https://www.mcmaster.ca/academicintegrity/turnitin/students/index.html>

Copyright Policy

In this course you will have access to material that is subject to copyright laws. This includes (but is not limited to) textbooks and all resources developed by the instructors such as lab manuals, demonstration videos, quizzes, assignments, tests, class notes and class slides. Under no circumstance are you allowed to share or redistribute this material in any printed or electronic form without the explicit written consent of the copyright holder. This includes posting any course material on Internet bulletin boards, course repositories, social networks, etc.

McMaster Accommodation for Religious, Indigenous and Spiritual Observances Form (RISO):

At the beginning of EACH term, visit the website of the Office of the Associate Dean (Academic) <https://www.science.mcmaster.ca/associatedean/current-students/procedures-forms.html> if you need accommodations for religious, Indigenous and/or spiritual observances. Follow the procedure explained there under “Accommodation for Religious, Indigenous and Spiritual Observances Form (RISO)”.

Inclusivity and Accommodations:

McMaster University aims to foster a supportive, inclusive learning environment that will encourage both individual and collective growth. Students are required to register with Student Accessibility Services (SAS) first (<https://sas.mcmaster.ca/>). Any student who then wishes to invoke an accommodation for any aspect(s) of this course must contact the instructor at the beginning of the semester to discuss how the accommodations detailed in their SAS letter will be fulfilled in this course.

Policy about Online Access or Online Course Work Requirements: If your course has an online element:

In this course we will be using email and Avenue. Students should be aware that, when they access the electronic components of this course, private information such as first and last names, user names for the McMaster e-mail accounts, and program affiliation may become apparent to all other students in the same course. The available information is dependent on the technology used. Continuation in this course will be deemed consent to this disclosure. If you have any questions or concerns about such disclosure please discuss this with the course instructor.

The instructors and the university reserve the right to alter this outline if necessary.

The instructors and university reserve the right to modify elements of the course during the term. The university may change the dates and deadlines for any or all courses in extreme circumstances. If either type of modification becomes necessary, reasonable notice and communication with the students will be given with explanation and the opportunity to comment on changes. It is the responsibility of the student to check their McMaster email and course websites weekly during the term and to note any changes.