

eru-outline.md - Grip

title: eru-outline

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ERU - Module Outline

Instructor: Jay Brodeur

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Module 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 they work, as well as how to build useful electronic devices from relatively simple components. Thanks to the widespread availability of inexpensive, user-friendly and well-documented electronics like [Arduinos](#), learning and developing electronic skills has become attainable (and dare we say, even fun) for students of all ages and degrees of experience.

In this module, students will develop their electronic fluency and build functional, useful devices through a collaborative, hands-on introduction to the fundamentals of electronics. Students will learn the basics by building simple circuits that integrate Arduino microcontrollers with various sensors and actuators. Participants will also gain experience with programming through developing the software code required to control the devices. Working with the instructor and small support groups, students will consolidate their learning by building a simple device that integrates a variety of sensors (temperature, light, etc.) and actuators (LEDs, buzzers, etc.). Students will document their work and share their final devices on their own simple project webpage, which will be created in GitHub Pages.

Module objectives:

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

1. Explain the fundamental concepts and operational principles of simple circuits, sensors and actuators
2. Apply fundamental principles to build simple circuits that interact with their surrounding environments
3. Create and modify software code to control the device and create comments to document its functionality
4. Apply your skills, knowledge and creativity in the process of creating an original electronic device
5. Use Markdown to format text in a simple yet effective manner
6. Create, edit, and version control files in a GitHub repository
7. Use GitHub Pages to share your results on an openly-accessible webpage

Module structure and schedule:

Students will be required to work approximately 3 hours per day for four consecutive days (May 19 to May 22). Working time will be split between synchronous classwork, synchronous group work, and asynchronous

independent work. The instructor will be available for consultation during all working periods, regardless of whether synchronous activities are taking place.

The module will be delivered using a variety of different modes. All synchronous sessions will be carried out using MS Teams (Jay has added (or will soon add) you to a Team). Following the opening class, most work can be done asynchronously (using prepared guides and videos), though it is still expected that you participate in the group support sessions.

- Asynchronous working time: Using prepared guides and videos to complete the lessons
- Synchronous sessions:
 - Synchronous lessons with Jay: Meeting on the “General” channel of our Team
 - Synchronous support time with Jay: Meeting on the “General” channel of our Team
 - Synchronous group support time: Meeting in your group’s channel of our Team

Date	Time	Details
Tues, 19-May	4:00 - 6:00 pm	Introductory session (everyone); breakout session (groups)
	8:00 - 9:00 pm	Working time with support
Wed, 20-May	4:00 - 5:00 pm	Introduction to day 2; check-ins & updates
	5:00 - 6:00 pm	Working time with support
	8:00 - 9:00 pm	Group breakout session
Thur, 21-May	4:00 - 6:00 pm	Introduction to day 3; Working time with support
	8:00 - 9:00 pm	Working time with support
Fri, 22-May	4:00 - 6:00 pm	Working time with support; Final device presentations
	8:00 - 9:00 pm	Extra support time, if required (but probably not)

Equipment and software required:

Students will require the following equipment to participate in the course:

- A computer (preferably a laptop) with Windows, Linux, or Mac OS, with a USB connection and capable of installing [Arduino IDE software](#). Chromebooks can be accommodated with a bit of effort.
- [Arduino IDE software](#) installed.
- GitHub Desktop software is optional.
- A basic Arduino kit will be mailed to participants

Assessment and module deliverables

All deliverables will be compiled in a GitHub repository that you will create for this module. You will upload a number of Arduino sketches (code), and a few images that document your work. Descriptions of your work, and reflections on your progress will be compiled within a single [Markdown](#) document that includes images and video of your final device. [GitHub Pages](#) will be used to turn your markdown document to a simple project webpage.

Deliverable	Weight	Notes
Day 1 reflection + embedded photo	15%	Started on Day 1; Completed on Day 2
Day 2 results + uploaded thermometer code	20%	Completed on Day 2
Final device description + code + sales pitch video	40%	Completed by Day 4
Final reflection & summary	15%	Completed on Day 4
Overall project webpage quality	10%	

The module will be graded out of 100 points. See the point breakdown and evaluation criteria below:

Deliverable 1. Day 1 reflection + embedded photo

1. Provide a ~250 word reflection on your first day of the module, and discuss why you're interested in this module and what you hope to take away from it.
2. Take a photo of one of your circuits (ideally from the Button example). Upload it to the /docs/images/ directory of your project repository
3. Link to your uploaded photo in the Markdown file **See the [Day 1 & 2 Worksheet](#) and the commented section of your index.md file for more information.

Total points: 15

- Reflection (/10) -- see notes below about reflections
- Embedded photo (/3)
- Working webpage (/2)

Deliverable 2: Day 2 results + uploaded thermometer code

1. Upload your fully-commented Arduino sketch from your final Day 2 build task--a thermometer connected to an RDB LED--into your GitHub repository.
2. Provide a short (~150 words) summary of your work on this circuit:
 - How does your device work?
 - What was challenging?
 - What worked? What didn't?
3. Be sure to link to your code (in your GitHub repository) in the text of your response. **See the [Day 1 & 2 Worksheet](#) and the commented section of your index.md file for more information.

Total points: 20

- Summary is complete and well-written (/5)
- Code (/15)--see notes below about code

Deliverable 3 Final device description + code + sales pitch video

1. Upload your fully-commented Arduino sketch from the final product of your Arduino build-off into the top-level of your module GitHub repository.
2. In ~300 words, provide a final device description and product pitch:
 - What does it do? Use a table (created in markdown) to list and describe the features. You can use the template provided below.
 - Describe briefly how it works.
 - How could it be used in everyday life (or maybe just in rare cases)?
 - Be sure to link to your code (in your GitHub repository) in the text of your response.
 - Include a snippet of code using the characters to display the code properly.
3. Finally, record a short (30 second) video of a 'product pitch' for your device.
 - Upload the video to YouTube, and embed it into your webpage (see Markdown code found in comments in index.md).

Total points: 40

- Description is complete and well-written; table displays properly (/10)
- Code (/15)--see notes below about code
- Project pitch video
 - Originality and creativity (/10)
 - Production value (/5)

Deliverable 4. Final reflection & summary

1. In ~300 words:

- Summarize your experience in this module. What you learned, what you liked, what you found challenging.
- Reflect upon your learning and its relevance in your life.

Total points: 15

- Reflection (/15) -- see notes below about reflections

Deliverable 5. Overall project webpage quality

Total points: 10

- All content is included (/5)
- Content is formatted neatly (/5)

A NOTE ON Reflections

Reflections will be evaluated according to the following criteria:

- Depth of reflection
- Connections with other learning and life experiences
- Composition (spelling, grammar, formatting) Students are encouraged to follow the general guidance on reflections provided generally for INSPIRE 1A03.

A NOTE ON Uploaded code

Uploaded code will be evaluated according to the following criteria:

- Code compiles without error
- Code is organized and arranged neatly
- Sufficient commented preface, which outlines the purpose of the code, what it does, who created it, and when.
- Sufficient, plain-language comments throughout the code, which explain the functionality of sections of the code.

Instructor biography:

In his day job, [Jay Brodeur](#) is the Associate Director of Digital Scholarship Services in the McMaster University Library, where he oversees a variety of services that support research and instruction at McMaster. His background is in the Environmental Sciences, and his research interests include climate change, GIS and

geomatics, and data management. When he can, Jay also enjoys teaching; he regularly teaches in the iSci program, and has been fortunate to instruct courses in the Faculties of Science, Social Sciences, and Humanities, as well as the Arts & Science Program.

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