

LE/EECS1011 E & F - Computational Thinking through Mechatronics (Fall 2021-2022)

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Course Syllabus



Course Syllabus

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Course Description



The Objectives of 1011 are threefold: providing a first exposure to procedural programming, teaching students a set of soft computing skills (such as reasoning about algorithms, tracing programs, test-driven [development](#)), and demonstrating how computers are used in a variety of engineering disciplines. It uses problem-based pedagogy to expose the underlying concepts and an experiential laboratory to implement them. An integrated computing environment (such as MATLAB) is used so that students can pick up key programming concepts (such as variables and control flow) without being exposed to complex or abstract constructs. The problems are chosen with consultation with the various engineering disciplines in the Faculty with a view of exposing how computing is used in these disciplines. Course credit exclusions: LE/EECS1541 3.00.

A variant of this course outline is found as a [traditional PDF](#) here.

Main Topics

- The Computing Environment: Workspace, built-in commands, the debugger, unit testing, plots, etc.
- Variables and Expressions: Types, operators, precedence, round-off errors
- Control Structures: Selection and Iteration
- Encapsulation: Script files and functions
- Computational Thinking: Process-based problem solving, unit tests as specification

Skills

- Reasoning about Algorithms
- Tracing / debugging a program
- Test-driven [development](#)

Applications

- General science and mathematics
- Engineering applications related to existing programs in the Lassonde School.

Course Format



All activities are taking place on-line, from pre-recorded (asynchronous) class sessions, to synchronous online labs, etc. See eClass for a week-by-week breakdown of the activities.

Important dates

- **First day of class:** Wednesday Sept 8, 2020
- **First week of labs:** Monday, Sept 1, 2021 – Friday, Sept 17, 2019 (Online WHMIS training)
- Fall Reading Week (no classes): Oct. 9 – 15, 2021
- Last day of classes: December 7, 2021.

Class times (synchronous, on Zoom):

- Class time for Section E is: Mondays & Wednesdays from 10:30am to 11:30am ("Toronto time")
- Class time for Section F is: Mondays & Wednesday from 11:30am to 12:30pm ("Toronto time")

Synchronous **classes** are completely *optional*.

Synchronous **labs** are *mandatory*, but you can miss up to two synchronous lab sessions for *any* reason without penalty. This is a universal accommodation that covers sickness, religious holidays, bad hair days or anything else. Absences beyond those two require formal justifications and may result in penalties to your grade.

The location and time of your class and lab are specific to your enrollment. **Only attend (virtually) labs that you are enrolled in** as labs are at capacity and teaching assistant resources are distributed as required to meet the official distribution. Work submitted (demonstrations, during online lab sessions) in the wrong section, room or time will not be graded and you will receive a zero for that work.

Dates are subject to change. Verify with the official university calendar and possibly with the instructor prior to scheduling events that may potentially conflict with class and lab times as well as examinations.

Course Learning Outcomes (CLOs) and Competencies

Each course in the Lassonde School of Engineering has explicit course learning outcomes (CLOs) and we are required to evaluate you on these at least once during the semester. Explicitly stating the learning outcomes is an important part of intentional, student-focused pedagogy and is also associated with how our programs are assessed by the [Canadian](#) Engineering Accreditation Board (CEAB). CLOs are course specific and are mapped to more general, program-level, characteristics ("CEAB Attribute #X" or "Graduate Attribute Indicator Y")

Upon the completion of this course, students are expected to learn and retain the following skills and knowledge, articulated in these course learning outcomes:

- 1 Explain and apply the fundamental constructs in procedural programming, including variables and expressions, control structures (conditionals/loops), and documentation (*CEAB Attribute #1 Knowledge Base for Engineering; Demonstrate skills in computer programming, data analysis and graphical visualization*)
- 2 Write simple programs using functions defined in m-files (*CEAB Attribute #5 Use of Engineering Tools; Select and adapt appropriate equipment and tools to perform tests or measurements*)
- 3 Use the computing environment to implement/simulate selected applications from science, math, and engineering (*CEAB*

Attribute #1: Knowledge Base for Engineering; Construct mathematical models to describe systems)

- 4 Use a set of soft computing skills such as reasoning about algorithms, tracing programs, and test-driven development for programming applications (*CEAB Attribute #1 Knowledge Base for Engineering; Demonstrate skills in computer programming, data analysis and graphical visualization*)

Teaching Team Information (Instructor and TAs)

Instructor: James Andrew Smith, PhD, PEng.

Office: Off-campus

Email: eecs1011.fall2021@gmail.com Twitter: @jasmith_yorku

Office hours: (*subject to change*)

· To be determined.

Information about Teaching Assistants (TAs), tech support, Zoom links for labs, etc. will be provided at a later date.

Course Materials

Lab Kit

You **must buy** a lab kit from the bookstore:

1. EECS 1011 Course Supplies Kit: <https://bit.ly/3n3Froz>
2. Multimeter: <https://bit.ly/38VGghv>

Both in-person and on-line students need to purchase the kit. The kit and multimeter are required. You may choose to create your own lab kit from individual components, but, if you do, you are responsible for making sure that all the parts are equivalent to the Bookstore's kit.

If we go back to in-person teaching, students will be responsible for bringing the kit to school. The kit is also used in EECS 1021 and EECS 2021, so you will get to reuse it once and maybe twice (or more!).

You are required to have Arduino-compatible hardware, based on the Grove Beginner Kit for Arduino, in EECS 1011. It is sold through the Bookstore.. Alternatives can be obtained if you have sufficient expertise to create a lab kit on your own or if you have special requirements due to the country you reside in (most countries accept shipments from the manufacturers in China even if Canadian distributors can't do so directly). Do not attempt to create a kit on your own without discussing the issue with the instructor, Dr. Smith.

Course Text & Software

MATLAB: A Practical Introduction to Programming and Problem Solving (5th Ed; 2019), available

- o **free** as a YorkU Library eBook (<https://bit.ly/3n5jnKe>)
- o For optional purchase as both paperback or eBook @ <https://bit.ly/2Kfpx6J>

Additional readings may be assigned or recommended during the course.



Software: **free** download MATLAB from The Mathworks: <https://www.mathworks.com/downloads/>

- Create an account at The Mathworks using your @my.yorku.ca email address.
- Download it onto your Mac or PC.

Course Structure

The instructional approach is based on "proficiency-based" grading applied to remote teaching due to pandemic conditions, described in detail in this [blog post](#) and [paper](#). It can also be called or considered "specifications-based grading". We use (1) required asynchronous video material posted on eClass, as well as interactive H5P and programming activities, along with (2) optional synchronous class time via Zoom for informal discussions and (3) required synchronous labs done over Zoom with lab kits that students purchase from the Bookstore. Students engage in a required Minor Project due by the end of the semester and can also do an optional Major Project to increase their grade.

Approach	Description
Classes	asynchronous pre-recorded with interactive content as well as synchronous discussion sessions
Labs	Real lab activities using "take home" lab kits, with assessments and interactions with teaching assistants during scheduled lab time over Zoom.
Projects	Minor Project: Using the same lab kit as in the lab, students create an automated plant watering system. Major Project: an optional project that can use many of the same components as the lab and minor project but topic is more open.
Assessments	All assessments are based on the concept of "proficiency-based grading". Demonstrate you know by doing.
Exams	No tests. No final exam, no midterm, no quizzes

Course Assessment & Evaluation

We are using a version of "Proficiency Grading" ([link](#)) for this course. Basically, it means that if you complete all the work in the course, you'll get a B+. (background: [1](#) and [2](#))

There are **no midterms and no final exams** in this class.

To achieve an A or A+ you will need to perform additional work related to a *major* computer organization project. Details on this to be released later in the semester.

The B+ portion of the class is made up of these main components. Each is worth an equivalent portion of your B+:

- 1 Labs (lab reports, lab demonstrations, etc.): 20%
- 2 *Minor* Project: 20%



- 3 Class Readings and videos (tracked on eClass): 20%
- 4 Online interactive activities (Matlab Grader, non-video H5P, etc.): 20%

Effectively, each of these is worth 20% of your final grade. Each sub-component within the main components is weighted identically (signified by a grade of 1) unless it is stated otherwise.

Lab activities

Each lab is worth an equal portion of the 20%, no matter what the breakdown of points or marks in a given lab. For instance, if there were five labs in a semester and Lab X's marking guide had 15 points in it and you received 7 points, it would be worth 1.87 out of 20 (i.e. $20/5 \cdot (7/15)$) associated with all the labs.

Labs are held over Zoom sessions, synchronously. You are required to attend and to usually demonstrate a program or working piece of hardware. Teaching assistants will grade you based on your demonstrations during these labs. Short reports may also be required.

Lab session times are listed on the w2prod.sis.yorku.ca website. Zoom links will be announced on eClass.

Missing labs

Regarding **lab attendance** I want to make sure that we also remain **flexible** and **understanding** of the situations that we find ourselves in during the pandemic, so I want all of you to know that **you can miss up to two labs** during the semester with no penalty to your grade. No doctor's note or official absence justification will be required. If you attend all of the labs, we'll remove the worst two lab grades. If you miss one lab, we'll remove your single worst lab grade beyond the missed lab.

Any lab report is considered to be an integral component of a lab session, so if you miss a lab session, you don't need to submit a lab report. If you attend a lab for which a report is due and you do not submit the lab report, that is considered as having missed the lab.

This is a universal accommodation that covers sickness, religious holidays, bad hair days or anything else. No documentation or formal request is required. Absences beyond those two missed labs require formal justifications, and it is important to recognize that requests for accommodation grades.

The Projects

There are two projects in this course: the required minor project and the optional major project.

Minor project

Components completed during the semester outside of the labs and due to the final project report make up the 20% for the minor project. Some labs include a "check-in" related to the minor project. Any component of the minor project associated within a lab counts as the lab or part of the lab.

Major project

The *optional* **fifth component** is worth 20% and completing it will put you in a position to **achieve** A or A+. The major projects will be graded relative to one another, based on the skill and originality demonstrated in the submission. Students submitting major projects will be expected to make themselves available for a video conference interview to describe and discuss their project.

Note that the submission of a major project is not a guarantee of an A or A+. First, your pre-Major-Project grade must be a B+ in order to be considered for an A or A+; if your starting grade is less than B+, your maximum grade post-Major Project will be a B+. Second, relatively unskilled and/or unoriginal major projects are considered reasonable grounds for not assigning an A or A+. Simply resubmitting your minor project, or a slightly modified minor project, as a major project will not be considered for an A or A+.

Grading Scheme

The grading scheme used in this class is based, in large part, on the standard York grading scheme. The only major difference is that an exact 80% in this class represents a B+, while A and A+ require a greater than (*not* equal to) 80% result.



Course Calendar

We won't engage / use the [LMS calendar](#) this semester. Important dates will be communicated differently.

Course Communication Policies

NETiquette

In all online communications (e.g., email, online discussion, or other forms of online communications), please consider the guidelines from the Core Rules of Netiquette by Virginia Shea (<http://www.albion.com/netiquette/corerules.html>). Sometimes, online behaviour can appear to be inappropriate or disrespectful that it requires attention and follow up. In this case, please make sure you let your instructor know immediately so that the right resources can be identified to help.

You can email eeecs1011.fall2021@gmail.com to express questions, concerns, etc. It usually takes a few days or more to get back to you over email simply due to the number of students in the class. If you need faster feedback, please connect with the instructor over Zoom during the synchronous class time or the official office hours. In the **event** of a failure of the email system or eClass system, messages will be sent out over Twitter via [@jasmith_yorku](#) and the [#eeecs1011](#) hashtag.

Student Expectations & Course Specific Policies

- My expectations for you is that you will do all of the work posted on eClass, trying to finish each weekly module, including the pre-recorded interactive video lessons on time. I expect you to buy the lab kit in early September from the Bookstore. I expect you to attend the synchronous labs on time, to be respectful to the staff and your TAs. I expect that many of you won't come to the synchronous classes unless you want to chat or have questions. That's cool. But do consider coming and just keeping the class Zoom session on in the background in case something important is brought up.
- I don't like cheaters. I don't like people who copy from one another. Cheating does not help you learn and it is detrimental to your fellow students. I have designed the course so that it is eminently doable if you approach it in small chunks, on a regular basis. If you cheat in my class and I catch you I will engage the academic misconduct process, as I have done with dozens and dozens of students in the past. Don't be like those students. Be honest. Do your work. Ask me questions when you're stressed or confused. Don't take short-cuts.
- Don't upload the content from this course to sites outside of York University. That includes but is not limited to Chegg, Course Hero, Chegg, etc. Uploading course information to those sites is a violation of the intellectual property of the instructors and material authors. Getting caught doing so can have a serious impact on your status at the University. Why risk it? Furthermore, paying for this course does not entitle you to violate intellectual property, just like paying for a song on Apple Music doesn't entitle you to upload to a third party site.
- Regarding submitting work, lateness, etc., please read on...
 - **Course work Submission**
All work is submitted through eClass, whether it's H5P interactive videos, lab reports or project reports. Use the completion tracker to ensure that you are progressing through the course.
 - **Lateness Penalty**
Except for lab demonstrations and lab reports there are no deadlines for any of the material in class except for the last day of class, unless otherwise communicated to you by the instructor.
 - **Missed Labs**
Regarding **lab attendance** I want to make sure that we also remain **flexible** and **understanding** of the situations that we find ourselves in during the pandemic, so I want all of you to know that **you can miss up to two labs** during the semester with no penalty to your grade. No doctor's note or official absence justification will be required. If you attend all of the labs, we'll remove the worst two lab grades. If you miss one lab, we'll remove your single worst lab grade beyond the missed lab.

Any lab report is considered to be an integral component of a lab session, so if you miss a lab session, you don't



need to submit a lab report. If you attend a lab for which a report is due and you do not submit the lab report, that is considered as having missed the lab.

This is a universal accommodation that covers sickness, religious holidays, bad hair days or anything else. No documentation or formal request is required. Absences beyond those two missed labs require formal justifications, and it is important to recognize that requests for accommodation grades.

- **Missed Tests**

There are no tests. I'm pretty confident that you won't miss them.

Campus Policies

The university is filled with important resources, including:

- Academic Integrity (<http://www.yorku.ca/academicintegrity>)
- Student Code of Rights and Responsibilities (<https://calendars.students.yorku.ca/2021-2022/code-of-student-rights-and-responsibilities>)
- Accommodations for Students with Disabilities (<https://calendars.students.yorku.ca/2021-2022/academic-accommodation-for-students-with-disabilities>)
- Academic Policies and Regulations (<https://calendars.students.yorku.ca/2021-2022/policies-and-regulations>)
- Ethics review process for research involving human participants (<http://www.yorku.ca/research/support/ethics/>)
- Student conduct standards (<https://calendars.students.yorku.ca/2021-2022/student-conduct-and-responsibilities>)
- Religious Accommodation (<https://calendars.students.yorku.ca/2021-2022/religious-accommodation>)
- Copyright - Course materials are designed for use only in the course. Copying this material for distribution (e.g. uploading material to a commercial third-party website) may lead to a charge of misconduct under York's Code of Student Rights and Responsibilities and the Senate Policy on Academic Honesty and/or legal consequences if copyright law has been violated <http://www.copyright.info.yorku.ca>

Regarding accessibility, I have made a great effort to design this course to be as accessible as I can, practically. It's not perfect and I am open to hearing suggestions for improvement. That said, the basic structure of the course is designed to be accessible. You can miss up to two labs for any reason you wish. There are only a few deadlines: the ones associated with the synchronous labs because missing one deadline cascades into the other labs, as well as the deadline at the end of the semester in which you have to hand in **everything**. There's no getting around that one because missing that deadline will have a cascading effect on your final exam schedule (**even** though we don't have an exam in this class, you do in other courses).

The following is the official York University statement on accessibility. Please

York's course accessibility statement

Access/Disability

York University is committed to principles of respect, inclusion and equality of all persons with disabilities across campus. The University provides services for students with disabilities (including physical, medical, learning and psychiatric disabilities) needing accommodation related to teaching and evaluation methods/materials. These services are made available to students in all Faculties and programs at York University. Students in need of these services are asked to register with disability services as early as possible to ensure that appropriate academic accommodation can be provided with advance notice. You are encouraged to schedule a time early in the term to meet with each professor to discuss your accommodation needs. Please note that registering with disabilities services and discussing your needs with your professors is necessary to avoid any impediment to receiving the necessary academic accommodations to meet your needs. (<http://www.yorku.ca/secretariat/senate/committees/ascp/index-ascp.html>)



Other relevant links:

- Counselling and Disability Services - <http://cds.info.yorku.ca/>
- York University Racism Policy and Procedures - <http://secretariat-policies.info.yorku.ca/policies/racism-policy-and-procedures/>
- York University's Policies on Sexual Violence - <http://secretariat-policies.info.yorku.ca/policies/sexual-violence-policy-on/>
- York University's Policies on Gender/LGBTQ*/Positive Space - <http://rights.info.yorku.ca/lgbtq/>

Land Acknowledgement

We recognize that many Indigenous nations have long standing relationships with the territories upon which York University campuses are located that precede the establishment of York University. York University acknowledges its presence on the traditional territory of many Indigenous Nations. The area known as Tkaronto has been care taken by the Anishinabek Nation, the Haudenosaunee Confederacy, the Wendat, and the Métis. It is now home to many Indigenous Peoples. We acknowledge the current treaty holders and the Mississaugas of the Credit First Nation. This territory is subject of the Dish With One Spoon Wampum Belt Covenant, an agreement to peaceably share and care for the Great Lakes region.

- The Indigenous Framework for York University: A Guide to Action can be found here: <http://indigenous.info.yorku.ca/>
- Meaning of a land acknowledgement: <http://healthydebate.ca/opinions/indigenous-land-acknowledgements>

Print Syllabus

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