

Expanded Course Description

Lassonde School of Engineering
Electrical Engineering and Computer Science
LE/EECS 1011 3.0 Sections E & F
Computational Thinking in Mechatronics
Fall 2020

Course Calendar 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.

Course Instructor

Instructor: James Andrew Smith, PhD, PEng.

Office: Off-campus

Email: eecs1011.fall2020@gmail.com **Twitter:** @jasmith_yorku

Office hours: (*subject to change*)

- To be determined.

In the first few weeks of class, if there are significant issues related to registration or access to the learning management system (eClass) then announcements will be made via the eClass course page and/or on Twitter (hashtag #EECS1011 via @jasmith_yorku)

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.

Main Topics, Skills and Applications

1. Main Topics
 - a. The Computing Environment: Workspace, built-in commands, the debugger, unit testing, plots, etc.
 - b. Variables and Expressions: Types, operators, precedence, round-off errors

- c. Control Structures: Selection and Iteration
 - d. Encapsulation: Script files and functions
 - e. Computational Thinking: Process-based problem solving, unit tests as specification
2. Skills
 - a. Reasoning about Algorithms
 - b. Tracing / debugging a program
 - c. Test-driven development
 3. Applications
 - a. General science and mathematics
 - b. Engineering applications related to existing programs in the Lassonde School.

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*)

Course Text & Software

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

- **free** as a YorkU Library eBook (<https://bit.ly/3msGU4Z>)
- For **purchase** as both paperback and eBook @ <https://bit.ly/2Kfpx6J>

Additional readings may be assigned or recommended during the course.

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

- The Lassonde School pays for a very expensive University-wide licence so that you don't have to spend any additional money on the software. Download it onto your Mac or PC.

Times and Locations

Important dates

- **First day of class:** Sept 9, 2020 (*yes, we start on the first day!*)
- **First week of labs:** Wed, Sept 9, 2019 – Sun, Sept 13, 2019 (WHMIS)
- Second week of **regular** labs: Mon, Sept 14 – Sun Sept. 20.
- Fall Reading Week (no classes): Oct. 10 – 16, 2020
- Last day of classes: December 8, 2020.

Class times & locations:

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

Fixed assessment dates:

- There are none (i.e. no lab tests, midterms or final exams)
- All assessments, if not otherwise stated, are due by the very last day of class, before the final exam period.

Please keep in mind the dates listed on these three pages:

- <https://registrar.yorku.ca/enrol/dates/fw20>
- <https://registrar.yorku.ca/enrol/dates/religious-accommodation-guidelines-2020-2021-academic-year>
- <https://registrar.yorku.ca/enrol/dates/statutory-dates-2020-2021-academic-year>

Classes and labs are held online, typically on Zoom connections (URLs posted on eClass).

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.*

Assessments

Assessments are conducted throughout the semester and students should be referring to the eClass site to keep track. The eClass site will be updated as required and no guarantees are made about making explicit announcements for any particular update.

We are using "Proficiency Grading" ([link](#)) for this course. Basically, it means that if you complete all the work in the course you'll get a B+. No midterm, no final exam. To achieve an A or A+ you will need to perform additional work related to a *major* programming project. Details on this to be released later in the semester.

The B+ portion of the class is made up of four 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 stated otherwise.

Lab components: 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. $20/5*(7/15)$) associated with all the labs.

Minor project: Any component of the minor project associated with a lab counts as a lab. Components completed during the semester outside of the labs and due to the final project report make up the 20% for the minor project.

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+. For example, not completing the four main components of the course or submitting a trivial, relatively unskilled and/or unoriginal major project will be considered grounds for not assigning an A or A+.

The final grade for the course is obtained by combining the scores of the tests and converting this total to a letter grade according to the following table.

≥ 90	> 80	≥ 75	≥ 70	≥ 65	≥ 60	≥ 55	≥ 50	≥ 40	< 40
A+	A	B+	B	C+	C	D+	D	E	F

Missed labs, tests and other assessments: Students with a documented reason for missing an assessment, such as illness, compassionate grounds, etc., will have the weight of the missed assessment(s) shifted to the most relevant assessment category. For missed labs, the weight will be transferred to the remaining labs. For missed lab tests, in-class assessments, online assessments (as applicable), the weight will be transferred to the remaining lab tests, in-class assessments, or interactive online assessments, respectively. For session with final exams (not Fall 2020), if there are no more assessments in the term, the weight in question will be shifted to the final exam.

The only accepted documentation for missing a lab or test due to illness is a completed an official York University "Attending Physician's Statement". However, once a student begins writing a test, the weight of that test will not be shifted for any reason. Thus, if a student is not feeling well, it is recommended that the student not attend the test, seek the advice of a physician, and submit a completed an official York University "Attending Physician's Statement" to the instructor as soon as possible.

Academic Integrity

Except where explicitly told by the instructor (for example, during a group component of a two-stage exam, if applicable), during tests, quizzes or exams students are expected to do their own work. In those contexts, looking at someone else's work, talking, using aids not permitted (such as a phone), and impersonation are all examples of academically dishonest behaviour. As this is an important aspect of the university experience, students are expected to read and understand the Senate Policy on Academic Honesty.

The same issues of integrity apply to **online work**. Do the work yourself. While it is expected that you will be discussing elements of the online activities with others, in the class or outside the class, simply copying someone else's answer is not acceptable. **A good strategy** is to exchange ideas in generalized terms or related, parallel examples and then to then apply the shared knowledge to the specific example in the assessment.

If you have any questions or concerns please let the Dr. Smith know.

ACADEMIC INTEGRITY LINKS

- Senate Policy on Academic Honesty - <http://secretariat-policies.info.yorku.ca/policies/academic-honesty-senate-policy-on/>
- Academic Integrity - <http://lassonde.yorku.ca/academic-integrity>

STUDENT LINKS

- Student Rights and Responsibilities - <http://oscr.students.uit.yorku.ca/student-conduct>
- Religious Observance - <https://w2prod.sis.yorku.ca/Apps/WebObjects/cdm.woa/wa/regobs>
- Academic Accommodation for Students with Disabilities - <http://secretariat-policies.info.yorku.ca/policies/academic-accommodation-for-students-with-disabilities-policy/>

- Student Accessibility Services (SAS) - <https://accessibility.students.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 acknowledge our 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 Huron-Wendat, and the Métis. It is now home to many Indigenous Peoples. We acknowledge the current treaty holders, the Mississaugas of the New 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>