ECE 150: Fundamentals of Programming (Fall 2018)

Sections 001 and 002

Department of Electrical and Computer Engineering

University of Waterloo

(Outline adapted from Prof. Paul Ward's Fall 2017)

Course overview

This is an introductory course on computer programming for engineering students. This course will instruct students in problem solving with software. The course will provide students with the knowledge to direct a computer to perform functional operations using the C++ programming language.

Undergraduate calendar description

Software design process in a high-level programming environment. Programming fundamentals, language syntax, simple data types, control constructs, functions, parameter passing, recursion, classes, arrays and lists, list traversals, introduction to searching and sorting algorithms, basic object-oriented design, polymorphism and inheritance, simple testing and debugging strategies, pointers and references, basic memory management.

Programming Language

This course will teach the C++ programming language.

Learning outcomes

By the end of this course, students that have satisfactorily completed the course requirements should be able to:

1. Instruct computers to carry out operational tasks using the C++ language.
2. Demonstrate ability to perform both procedural programming and object-oriented programming.
3. Develop and implement programs to solve electrical and computer engineering
4. Demonstrate ability to test and debug programs
5. Demonstrate ability to analyze program performance

Pre-requisites

1A Electrical or Computer Engineering student.

Course website

All lecture presentations will be available at https://ece.uwaterloo.ca/~ece150/. Additional material will be available on https://learn.uwaterloo.ca/.

Textbook

There is no textbook for this course. There are many on-line resources available for assistance in learning C++, including on-line text books and tutorials.

Class schedule

Midterm week: Classes are not held during midterm week. The midterm exam for this course will be held on Friday October 19, 2018 from 14.30 – 16.20. Sections 001 and 002 will write the same midterm.

Assignments and projects

Students will be required to complete programming assignments and projects. The tentative schedule identifying the due dates for each assignment (prefixed with an A) and project (prefixed with a P) are shown in the table below. Please note that this schedule is tentative and may change. We plan to typically release the assignments and project specifications a week before its due date.

Assignments will provide several problems to exercise key concepts presented in the lectures for that week. Projects will require students to solve a problem using programming. Projects would be significantly larger in time commitment than assignments.

Assignments will be reviewed, but no marks will be awarded to them. The purpose of the assignments will be for us to provide students with feedback.

Projects will be reviewed, and graded. Please see the grade scheme section for more details.

Week	Weekdays	Assignments	Projects
1	Sept 3 – Sept 7		
2	Sept 10 – Sept 14	Assignment 0 due	
3	Sept 17 – Sept 21		Project 0 due
4	Sept 24 – Sept 28	Assignment 1 due	
5	Oct 1 – Oct 5	Assignment 2 due	
6	Oct 8 – Oct 12		Project 1 due
7	Oct 15 – Oct 19	*mid-term week*	
8	Oct 22 – Oct 26	Assignment 3 due	
9	Oct 29 – Nov 2		Project 2 due
10	Nov 5 – Nov 9	Assignment 4 due	
11	Nov 12 – Nov 16	Assignment 5 due	
12	Nov 19 – Nov 23		Project 3 due
13	Nov 26 – Nov 30	Assignment 6 due	
14	Dec 3 – Dec 7		

Tutorials

Tutorials will be used to review a subset of important concepts covered in the lectures, and to solve programming problems.

Laboratories

Labs will be where students can work on completing their assignments and projects. The WEEF tutor and teaching assistants will be available to provide assistance.

Teaching staff

Section 001	Douglas W. Harder	EIT-4018	dwharder@uwaterloo.ca
Section 002	Hiren Patel	E5-4018	hiren.patel@uwaterloo.ca
Support Tutor	David Lau	E2-1318A	d24lau@uwaterloo.ca

WEEF TAs are available in the WEEF Office.

Grading scheme

If M and F are the mid-term and final examination grades, respectively out of 100, and P is the cumulative project (each project being weighted equally) out of 100, then let

$$X = \frac{3}{8}M + \frac{5}{8}F$$

be your *examination grade*. The weight of the examinations and projects depends on X according to this table:

Your grade X on the examinations	$X \geq 60$	$40 \leq X \leq 60$	$X \leq 40$
Your grade in the course	$\frac{80}{100}X + \frac{20}{100}P$	$\left(-\frac{1}{100}X + \frac{7}{5}\right)X + \left(\frac{1}{100}X - \frac{2}{5}\right)P$	X

Essentially, if you get below 60 on your examination grade, your projects begin to count less and less until your examination grade is 40, at which point, the projects count for 0 and the examination grade is your final grade.

Course topics

This course plans to cover the following topics:

1. Programming fundamentals
2. Addresses and pointers
3. Intermediate programming concepts
4. Searching algorithms
5. Sorting algorithms
6. Classes
7. Linked lists
8. Inheritance and polymorphism

Please visit https://ece.uwaterloo.ca/~ece150/Lecture_materials/ for a more detailed topic list.

Course policies

Collaboration and plagiarism: All assignments, projects and exams are to be done individually. Any instances of plagiarism will result in an automatic grade of 0 for that assessment, and -5% of the final grade per infraction.

Late submissions: No late submissions will be accepted.

Re-marking: If you believe that your grade for any exam or project is incorrect or unfair, you may ask that it be re-marked. You must present **in writing** a clear description of what is incorrect or unfair, and submit this document in addition to the original submission for re-marking within **two weeks of the grade** being returned to you. We will re-mark the project or exam in its entirety. The re-marked grade may be lower than the original grade. Note that the re-marked grade is final, and no further requests for re-marking will be allowed.

Territorial Acknowledgement

We acknowledge that the University of Waterloo is located on the traditional territory of the Attawandaron (Neutral), Anishnaabeg and Haudenosaunee (Iroquois) peoples. The University of Waterloo is situated on the Haldimand Tract, the land promised to the Six Nations of the Haudenosaunee (the Cayuga, Mohawk, Oneida, Onondaga, Seneca and Tuscarora peoples) that includes six miles on each side of the Grand River.

University-requires statements

Academic Integrity

In order to maintain a culture of academic integrity, members of the University of Waterloo community are expected to promote honesty, trust, fairness, respect and responsibility. See the UWaterloo Academic Integrity webpage and the Arts Academic Integrity webpage for more information.

Discipline

A student is expected to know what constitutes academic integrity, to avoid committing academic offences, and to take responsibility for his/her actions. A student who is unsure whether an action constitutes an offence, or who needs help in learning how to avoid offences (e.g., plagiarism, cheating) or about "rules" for group work/collaboration should seek guidance from the course professor, academic advisor, or the Undergraduate Associate Dean. When misconduct has been found to have occurred, disciplinary penalties will be imposed under Policy 71 – Student Discipline. For information on categories of offenses and types of penalties, students should refer to Policy 71 - Student Discipline. For typical penalties check Guidelines for the Assessment of Penalties (https://uwaterloo.ca/secretariat-general-counsel/policies-procedures-guidelines/guidelines/guidelines-assessment-penalties).

Grievance

A student who believes that a decision affecting some aspect of his/her university life has been unfair or unreasonable may have grounds for initiating a grievance. Read Policy 70 - Student Petitions and Grievances, Section 4 (https://uwaterloo.ca/secretariat-general-counsel/policies-procedures-guidelines/policy-70). When in doubt, please be certain to contact the department's administrative assistant who will provide further assistance.

Appeals

A decision made or penalty imposed under Policy 70, Student Petitions and Grievances (other than a petition) or Policy 71, Student Discipline may be appealed if there is a ground. A student who believes he/she has a ground for an appeal should refer to Policy 72, Student Appeals (https://uwaterloo.ca/secretariat-general-counsel/policies-procedures-guidelines/policy-72).

Note for Students with Disabilities

The AccessAbility Services office, located on the first floor of the Needles Hall extension (NH 1401), collaborates with all academic departments to arrange appropriate accommodations for students with disabilities without compromising the academic integrity of the curriculum. If you require academic accommodations to lessen the impact of your disability, please register with the AS office at the beginning of each academic term.

Text-matching software

Text-matching software (Turnitin® or MOSS) will be used to screen assignments in this course. This is being done to verify that use of all material and sources in assignments is documented. Students will be given an option if they do not want to have their assignment screened by the software. In the first week of the term, details will be provided about arrangements and alternatives for the use of text-matching software in this course.