CS 105 Introduction to Computer Programming 1

Winter 2022 Course Outline

Last revised: November 30, 2021

About the Course

- **LEARN Site** https://learn.uwaterloo.ca/
  This is the main site for the course. For announcements, course content, lab and assignment submissions, grades.
- **Microsoft Teams Discussion Boards**
  For questions and clarifications about labs, assignments, and course content. Also, for group work on labs.
- **Public Website** www.student.cs.uwaterloo.ca/~cs105
  For general information about the course.

This is a fully online course. There are no in-person or on-campus lectures, labs, or tests.

Philosophy

CS 105 is designed to teach the fundamentals of computer programming through interactive visual media. In other words, rather than writing computer programs to manipulate symbolic data like numbers and text, this course emphasizes computer programs to generate and manipulate interactive visual media. This approach is well suited to visual thinkers and creative individuals, but these skills are not a requirement.

Since this course teaches universal programming concepts and programming methodologies, students can apply course knowledge to any type of problem or programming language. More generally, by learning to program, students will learn to think algorithmically: this means thinking in a methodical way to solve problems and accomplish tasks.

The course material does not require any prior computer programming experience or university-level mathematics. This course is primarily designed for students from the arts, social sciences, and sciences who are interested in computer programming, but are not planning to pursue a Computer Science degree.

Objectives

This course teaches computer programming concepts and methodologies using an imperative language for generating interactive visual media.

Intended Audience

CS 105 is intended for students who are familiar with the use of a computer (file management, web browsing, etc.) but have little or no experience with programming.

Related Courses

- Prerequisites: None
- Anti-requisites: CS115, CS135, CS145, CS137 and other courses in introductory computer science
- Successor: CS 106

Resources

Hardware and Software

All course material, assignments, and labs are based on JavaScript p5. JavaScript p5 is free and open source and compatible with the latest versions of most browsers running on OSX, Windows, and Linux.

All of our code will be shared and created using the Open Processing editor at https://openprocessing.org/. The University of Waterloo has a license to use this editor which makes the editor free to use for students in CS105.

Textbook

No required textbook, but there is a recommended textbook:

Lauren McCarthy, Casey Reas, and Ben Fry. *Getting Started with p5.js.* Published October 2015, Maker Media. Paperback. An electronic version of the textbook is available through the University of Waterloo library at: https://ocul-wtl.primo.exlibrisgroup.com/permalink/01OCUL_WTL/5ob3ju/alma9999865799983051 62

Anyone with an email address ending in uwaterloo.ca can access the above link. If you are asked to select your institution, then select "Not Listed" and log in using your uwaterloo.ca email address.

Lecture Handouts and Video Lectures available on LEARN

The lecture handouts contain the text and images of the lectures. Video lectures including demonstration and explanations of the lecture handouts are also available. Lecture handouts and lecture videos are typically available on LEARN one week before the scheduled lecture date.

Code Style Guide

The CS105 "Code Style Guide" is available on LEARN. It specifies how computer code should be formatted, commented, and advice for naming conventions and structuring.

Communication

Discussion Boards

Discussion Boards on Microsoft Teams will be used for all questions and clarifications about labs, assignments, and course content. If you feel you need to, Discussion Boards allow private posts that are viewable by only the instructors and TAs. However, whenever possible make a public post so others can benefit from your question and answers.

Email

Please contact the appropriate course staff.

Remember to always send email using your uwaterloo.ca email address.

Staff

All office hours will be posted on LEARN.

Mudassir Malik (Instructor)
- muddassir.malik@uwaterloo.ca

Barbara Daly (Instructional Support Coordinator)
- bmzister@uwaterloo.ca

Christopher He (Instructional Support Assistants
- cs105@uwaterloo.ca

Course Schedule

Topics

The following schedule is tentative and may change throughout the term, see the course LEARN site for updates. All assignments and labs are due at 5:00 PM.

Week	Date	Topics/Lectures	Assign	Assign Due Date	Labs	Labs Due Date
1	Wed, Jan 5- Frid Jan 7	00 Intro & Media Com.			0	Fri Jan 7
2	Mon, Jan 10 – Fri, Jan 14	01 Algorithms & Code 02 Drawing	1	Wed Jan 19	1, 2	Fri Jan 14
3	Mon, Jan 17 – Fri, Jan 21	03 Attributes 04 Interaction	2	Wed Jan 26	3, 4	Fri Jan 21
4	Mon, Jan 24 – Fri, Jan 28	05 Variables	3	Wed Feb 2	5, 6	Fri Jan 28
5	Mon, Jan 31 – Fri, Feb 4	06 Conditionals 12 Debugging	4	Wed Feb 9	7, 8	Fri Feb 4
	Mon Feb 7 – Fri Feb 11	07 Loops	5	Wed Mar 2	9,10	Fri Feb 11
6	Mon, Feb 14 – Fri, Feb 18	07 Loops			11	Fri Feb 18
7	Mon, Feb 21 – Fri, Feb 25	Reading Week				
8	Mon, Feb 28 – Fri, Mar 4	08 Functions	6 Test 1	Wed Mar 9 Fri Mar 4	12	Fri Mar 4
9	Mon, Mar 7 – Fri, Mar 11	08 Functions 09 Program Design	7	Wed Mar 16	13, 14	Fri Mar 11
10	Mon, Mar 14 – Fri, Mar 18	10 Arrays	8	Wed Mar 23	15, 16	Fri Mar 18
11	Mon, Mar 21 – Fri, Mar 25	10 Arrays 11 Images			17, 18	Fri Mar 25
12	Mon, Mar 28 – Fri, Apr 1	11 Images 13 Video and Sound			19, 20(optional)	Fri Apr 1
13	Mon, Apr 4 – Tues Apr 5	Review	Project	Tue Apr 5		

Grading

- Participation: 5%
- Labs: 15%
- Assignments: 45%
- Project: 10%
- Test 1 10%
- Test 2 15%

Participation

- On Campus will require an i-Clicker
- On Line will be determined weekly. Varies week-by-week.

Labs

There are approximately 20 lab programming exercises to be completed by students.

- Lab handouts are normally posted on LEARN early Sunday mornings, five days before the scheduled lab due date.
- There are usually two labs per week. Labs are normally due on Friday at 5:00 PM (unless otherwise indicated), see the schedule for details.

- Labs are created by the instructor and marked by the instructional support assistants and graduate teaching assistants based on specifications drawn up by the instructor.
- The grade will typically be available on LEARN less than 1 week after the due date.
- All labs are weighted equally.

Assignments

There are 8 programming assignments.

- All materials for the current week's assignment are posted on LEARN early Sunday mornings, ten days before the scheduled assignment due date.
- Assignments are due on Wednesdays at 5:00 PM (unless otherwise indicated), see the schedule for details.
- Assignments are created by the instructor and marked by the instructor, instructional support assistants, and graduate teaching assistants based on specifications drawn up by the instructor.
- The grade with feedback will typically be available on LEARN within 1 week after the assignment is due.
- The assignment with the lowest mark will be excluded, and the remaining 7 assignments will be weighted equally.

Final Project

The final project is an open-ended assignment where you design and implement a program of your choice. This is a culmination of all concepts learned throughout the term and a chance to conceive and design a complete program.

Exams

There is a midterm and final exam scheduled outside of lecture and lab times.

- You must pass the weighted average of the midterm and final exam to pass the course. Specifically, if the weighted average of your midterm and final exam is less than 50, you will fail the course regardless of your other marks in the course. In this case, your final course grade will be either the weighted average of the exams, or the overall course grade, which ever is lower. See the explanation of this in the first week's lecture.
- The midterm and final are created by the instructor and marked by the instructor, instructional support assistants, and graduate teaching assistants based on specifications drawn up by the instructor.

Policies

Group Work

Assignments: All assignments, tests, and the final project are individual work. There is no group work.

Labs: For labs you may discuss solutions with other students, but you must code your own solutions and submit your solutions on LEARN.

Lab and Assignment Submission

All assignments and labs must be submitted to LEARN.

- It is the student's responsibility to verify assignments and labs are submitted to the correct LEARN dropbox, in the correct format, and that the correct files were submitted.

Deadlines

Assignments, labs, final project, and tests that are submitted late will receive a mark of 0.

- There are no deadline extensions for Labs.
- There are no deadline extensions for Assignments.
- There is no deadline extension for the Final Project.
- There is no deadline extension for Tests.

After a due date has passed, you may still submit your work for feedback only (no marks). You must inform the CS105 instructional support assistants by email so they are aware of your submission and request for feedback.

Missed Work Due to Illness

With appropriate authorized documentation work may be excused. Work may be labs, assignments, the final project, or tests. If work is excused for documented reasons, normally its weight is distributed over the remaining un-excused work in that category. For example, if one assignment is missed for documented medical reasons, the remaining assignments are still valued at 45% of the final grade. In the interest of understanding the course material for future assignments and tests, students who miss work are encouraged to complete it when they are able, and submit it to cs105@uwaterloo.ca, and request feedback.

Remarking and Grade Appeals

If you believe errors were made in the marking any of your work, you need to submit a Remark Request on LEARN with a written explanation within a one week after the solutions are made available. In all cases, you should check the posted model solutions to understand your errors. Standard policy is that any remark request means the entire work will be remarked.

Other Important Information

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. Check the Office of Academic Integrity website, www.uwaterloo.ca/academicintegrity, for more information.

All members of the UW community are expected to hold to the highest standard of academic integrity in their studies, teaching, and research. This site explains why academic integrity is important and how students can avoid academic misconduct. It also identifies resources available on campus for students and faculty to help achieve academic integrity in –– and out –– of the classroom.

MOSS (Measure of Software Similarities) or a similar tool will be used in this course as a means of comparing students' assignments to ensure academic integrity.

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, http://www.adm.uwaterloo.ca/infosec/Policies/policy70.htm. When in doubt please be certain to contact the departments administrative assistant who will provide further assistance.

Discipline

A student is expected to know what constitutes academic integrity, to avoid committing academic offenses, and to take responsibility for his/her actions. A student who is unsure whether an action constitutes an offense, or who needs help in learning how to avoid offenses (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.

For information on categories of offenses and types of penalties, students should refer to Policy 71, Student Discipline, http://www.adm.uwaterloo.ca/infosec/Policies/policy71.htm. For typical penalties check Guidelines for the Assessment of Penalties, http://www.adm.uwaterloo.ca/infosec/guidelines/penaltyguidelines.htm.

Avoiding Academic Offenses

Most students are unaware of the line between acceptable and unacceptable academic behaviour, especially when discussing assignments with classmates and using the work of other students. For information on commonly misunderstood academic offenses and how to avoid them, students should refer to the Faculty of Mathematics Cheating and Student Academic Discipline Policy, https://uwaterloo.ca/math/current-undergraduates/regulations-and-procedures/cheating-and-student-academic-discipline-guidelines

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, http://www.adm.uwaterloo.ca/infosec/Policies/policy72.htm.

Note for students with disabilities

The Office for Persons with Disabilities (OPD), located in Needles Hall, 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 OPD at the beginning of each academic term.

See url: https://uwaterloo.ca/accessability-services/ for more information.

Intellectual Property

Students should be aware that this course contains the intellectual property of their instructor, TA, and/or the University of Waterloo. Intellectual property includes items such as:

- Lecture content, spoken and written (and any audio/video recording thereof);
- Lecture handouts, presentations, and other materials prepared for the course (e.g., PowerPoint slides);
- Questions or solution sets from various types of assessments (e.g., assignments, quizzes, tests, final exams); and
- Work protected by copyright (e.g., any work authored by the instructor or TA or used by the instructor or TA with permission of the copyright owner).

Course materials and the intellectual property contained therein, are used to enhance a student's educational experience. However, sharing this intellectual property without the intellectual property

owner's permission is a violation of intellectual property rights. For this reason, it is necessary to ask the instructor, TA and/or the University of Waterloo for permission before uploading and sharing the intellectual property of others online (e.g., to an online repository).

Permission from an instructor, TA or the University is also necessary before sharing the intellectual property of others from completed courses with students taking the same/similar courses in subsequent terms/years. In many cases, instructors might be happy to allow distribution of certain materials. However, doing so without expressed permission is considered a violation of intellectual property rights.

Please alert the instructor if you become aware of intellectual property belonging to others (past or present) circulating, either through the student body or online. The intellectual property rights owner deserves to know (and may have already given their consent).

Mental Health

If you or anyone you know experiences any academic stress, difficult life events, or feelings like anxiety or depression, we strongly encourage you to seek support.

On-campus Resources

- Campus Wellness https://uwaterloo.ca/campus-wellness/
- Counselling Services: counselling.services@uwaterloo.ca / 519-888-4567 ext 32655 / Needles Hall North 2nd floor, (NH 2401)
- MATES: one-to-one peer support program offered by Federation of Students (FEDS) and Counselling Services: mates@uwaterloo.ca
- Health Services service: located across the creek from Student Life Centre, 519-888-4096.

Off-campus Resources

- Good2Talk (24/7): Free confidential help line for post-secondary students. Phone: 1-866-925-5454
- Here 24/7: Mental Health and Crisis Service Team. Phone: 1-844-437-3247
- OK2BME: set of support services for lesbian, gay, bisexual, transgender or questioning teens in Waterloo. Phone: 519-884-0000 extension 213

Diversity

It is our intent that students from all diverse backgrounds and perspectives be well served by this course, and that students' learning needs be addressed both in and out of class. We recognize the immense value of the diversity in identities, perspectives, and contributions that students bring, and the benefit it has on our educational environment. Your suggestions are encouraged and appreciated. Please let us know ways to improve the effectiveness of the course for you personally or for other students or student groups. In particular:

- We will gladly honour your request to address you by an alternate/preferred name or gender pronoun. Please advise us of this preference early in the semester so we may make appropriate changes to our records.
- We will honour your religious holidays and celebrations. Please inform of us these at the start of the course.
- We will follow AccessAbility Services guidelines and protocols on how to best support students with different learning needs.