

CS 105 Introduction to Computer Programming 1

Winter 2023 Course Outline

Last revised: Wednesday, January 8, 2023

About the Course

- **LEARN Site** <https://learn.uwaterloo.ca/>
This is the main site for the course. For announcements, course content, labs and assignment submissions, grades, and text-based questions about course content and assignments.
- **Microsoft Teams Discussion Boards**
Virtual office hours will be held on Microsoft Teams. You can ask questions about labs, assignments, and course content. Also, for group work.
- **Public Website** www.student.cs.uwaterloo.ca/~cs105
For general information about the course.

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: CS135, CS136
- 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/alma999986579998305162

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.

Staff

All office hours will be posted on LEARN and the course webpage.

Muddassir Malik (Instructor)

- muddassir.malik@uwaterloo.ca
 - course content questions

Barbara Daly (Instructional Support Coordinator)

- bmzister@uwaterloo.ca
 - technical issues with course websites, etc.
 - missing grades on LEARN
 - illness, absences

Jennifer Phovixay (Instructional Support Assistant)

- cs105@uwaterloo.ca

Instructional Apprentices

Cheryl Lao

Yen-Ting Yeh

Course Schedule

Three hours of lecture per week, plus two 1.5 hour mandatory labs per week.

Lectures

001 MW 11:30-12:50 MC2034

Lab Sections

101 2:30-3:50 MW MC 3003

102 2:30-3:50 MW MC 3005

Topics

The following schedule is tentative and may change throughout the term, see the course LEARN site for updates. We will keep the webpage

Week	Date	Topics/Lectures	Assignment	Assignment Due 5:00pm	Lab	Lab Due Due 5:00pm
1	Mon, Jan 9 – Fri, Jan 13	00 Introduction 01 Algorithms & Code 02 Drawing	None	None	0, 1	Fri Jan 13
2	Mon, Jan 16 – Fri, Jan 20	03 Attributes 04 Interaction	1	Wed Jan 18	2, 3	Fri Jan 20
3	Mon, Jan 23 – Fri, Jan 27	05 Variables	2	Wed Jan 25	4, 5	Fri Jan 27
4	Mon, Jan 30 – Fri, Feb 3	06 Conditionals	3	Wed Feb 1	6, 7	Fri Feb 3
5	Mon, Feb 6 – Fri, Feb 10	07 Loops	4	Wed Feb 8	8, 9	Fri Feb 10
6	Mon, Feb 13 – Fri, Feb 17	07 Loops	5	Wed Feb 15	10, 11	Fri Feb 17
	Mon Feb 20 – Fri, Feb 24	Reading Week	None			
7	Mon, Feb 27 – Fri, Mar 3	08 Functions	None	None	12	Fri Mar 3
		Midterm	Friday Mar 3rd, 18:30 – 20:00			
8	Mon, Mar 6 – Fri, Mar 10	12 Debugging 10 Arrays	6	Wed Mar 8	13, 14	Fri Mar 10
9	Mon, Mar 13 – Fri, Mar 17	10 Arrays 11 Images	7	Wed Mar 15	15, 16	Fri Mar 17
10	Mon, Mar 20 – Fri, Mar 24	11 Images 09 Program Design	8	Wed Mar 22	17, 18	Fri Mar 24
11	Mon, Mar 27 – Fri, Mar 31	13 Video and Sound	None	None	19, 20	Fri Mar 31
12	Mon, Apr 3 – Mon, Apr 10	13 Video and Sound	Project	Mon Apr 10	None	None

Grading

- Participation 5%
- Labs: 5%
- Assignments: 24%
- Project: 6%
- Midterm: 20%
- Final: 40%
- Academic Integrity Bonus 1%

The plan is that there will be a corresponding assignment for each module.

Protip: Although each assignment will be weighted the same, it is inevitable that some assignments will be harder and/or require more work than others.

Participation

Clickers will be used during all lectures starting in the second week for feedback and small multiple choice quizzes.

- Participation is calculated by taking the best 75% of clicker grades.
- Students will use a phone or laptop for participation with iClicker software.
- It is not possible to submit clicker answers in any other form, such as email or paper.

Labs

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

- Lab handouts are normally posted on LEARN early Monday mornings
- There are usually two labs per week. Labs are normally due on Fridays at 5:00 PM (unless otherwise indicated), see the schedule for details.
- Labs are created by the instructor and marked by the Instructional Support Assistant 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.
- The two labs with the lowest mark will be excluded, and the remaining labs will be weighted equally.

Assignments

There are 8 programming assignments.

- All materials for the current week's assignment are posted on LEARN early Monday 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 Instructional Support Assistant, 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.
- Your lowest assignment mark will be dropped.

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 a 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, whichever is lower.
- 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.

Academic Integrity Bonus

There is a series of 6 quizzes for you to complete in Learn. Completion of all 6 will earn a bonus of 1% towards your final grade.

Policies

Group Work

Assignments: All assignments and quizzes. 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 and final projects 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.

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 30% 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, <https://uwaterloo.ca/secretariat/policies-procedures-guidelines/policy-70> 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, <https://uwaterloo.ca/secretariat/policies-procedures-guidelines/policy-71> . For typical penalties check Guidelines for the Assessment of Penalties, <https://uwaterloo.ca/secretariat/guidelines/guidelines-assessment-penalties>

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 AccessAbility Services (AAS), located in Needles Hall, Room 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 AAS 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.