

## Fall 2020, CS 116, Introduction to Computer Science 2

### Course Meet Times

#### Lectures:

LEC 041: Online

LEC 042: Online

LEC 043: Online

#### Tutorials:

TUT 141: Online

TUT 142: Online

TUT 143: Online

TUT 144: Online

TUT 145: Online

### Instructor Contact Information

Carmen Bruni

email address: [cbruni@uwaterloo.ca](mailto:cbruni@uwaterloo.ca)

office hours: Mondays – Thursdays, 10:30 – 11:30 a.m. and 12:30 – 1:30 p.m.

Lori Case

email address: [lori.case@uwaterloo.ca](mailto:lori.case@uwaterloo.ca)

office hours: Mondays, 2:00 - 3:00 p.m.; Tuesdays, 11:30 a.m. – 1:00 p.m.;  
Thursdays and Fridays, 11:30 a.m. – 12:30 p.m.

Stacey Watson

email address: [stacey.watson@uwaterloo.ca](mailto:stacey.watson@uwaterloo.ca)

office hours: Mondays, 9:00 – 10:00 a.m.; Tuesdays and Thursdays, 9:00 – 10:30 a.m.

### TA Contact Information

Geetika

email address: [cs116@uwaterloo.ca](mailto:cs116@uwaterloo.ca)

office hours: Mondays, 3:00 – 5:00 p.m.; Thursdays, 2:00 – 4:00 p.m.

Pauline

email address: [cs116@uwaterloo.ca](mailto:cs116@uwaterloo.ca)

office hours: Tuesdays, 2:00 – 4:00 p.m.; Fridays, 3:30 – 5:30 p.m.

Ina

email address: [cs116@uwaterloo.ca](mailto:cs116@uwaterloo.ca)

office hours: Wednesdays and Fridays, 9:30 – 11:30 a.m.

Avery

office hours: Wednesdays, 1:30 – 3:30 p.m.; Fridays, 2:30 – 3:30 p.m.

Kyle

office hours: Tuesdays, 7:00 – 9:00 p.m.; Thursdays, 7:00 – 8:00 p.m.

## Course Description

CS 116 continues the development started in CS 115, transitions to imperative programming, and introduces important issues in Computer Science.

## Course Objectives

At the end of the course, students should be able to

- Given a clear and concise statement of a problem or task, write a program from scratch of up to a hundred lines of properly-formatted, tested, and documented Python code to solve the problem or carry out the task
- Use higher-order functions to improve the readability and efficiency of programs
- Use various forms of recursion (structural, accumulative, generative) in programs
- Use various forms of iteration (for, while) in programs
- Describe the basic memory model for mutation of basic types, lists, and objects in Python
- Distinguish between constant, linear, quadratic and exponential running times of algorithms
- Explain the relative advantages and disadvantages of lists and dictionaries
- Write useful Python programs using console and file input and output for practical tasks

## Topic Overview

Introduction to imperative programming (15 hours)

- Common features of imperative languages
- Basics of Python: assignment and introduction to mutation, basic console output and keyboard input, basic program structure, defining and using functions
- Relating concepts from Racket to Python: lists of basic types, if statements, including nested conditionals; basic structural recursion; abstract list functions and lambda
- Basic Python memory model, including lists

More advanced concepts from imperative programming (15 hours)

- Additional forms of recursion: accumulative and generative
- Iteration: bounded (for loop), guarded (while loop); simple and nested iteration; applications, including linear and binary search algorithms
- Investigating several sorting algorithms
- Dictionaries
- Basic use of classes (in comparison to Racket structures), introduction to object-oriented principles in Python, and mutation of objects
- Functions as parameters: extending the design recipe to include polymorphism
- File input and output: basic and structured file processing
- Additional topics, possibly including programming with real world data, web pages, etc.

## Issues in Computer Science (6 hours)

- Basic introduction to run-time analysis and simple run-time classes (constant, logarithmic, linear, linearithmic, quadratic, exponential) through studied algorithms
- Discussion of design issues related to data structures (for example, choosing between lists and dictionaries) and effects on complexity and memory requirements

## Grading Scheme

- Warm-up Quizzes: 5%
- Concept Checks: 10%
- Wrap-up Quizzes: 5%
- Assignments: 60%
- Final Project: 20%

## Notes:

*Quiz Questions:* The quizzes will each have one attempt for non-programming problems and unlimited attempts for programming problems. The quizzes will be weighted according to the module (not according to how many problems solved per module as some modules might have more problems than others).

*Concept Checks:* The Concept Check questions will each have two attempts for non-programming problems and unlimited attempts for programming problems. This allows you to make mistakes while learning the content and still obtain a good grade. Some of these are intentional — questions that are a bit beyond what you can do in order to reinforce understanding and some are questions that have common misconceptions that are meant to trick you in order to resolve a misconception. Again do not be worried about getting perfect on everything because you are not expected to. Mistakes are going to happen because you are learning and the grading scheme is meant to allow for some of these mistakes to occur. If you follow through all of the coursework, start assignments early and ask for help, you should be able to do really well in this course. The concept checks will be weighted evenly (not according to how many problems solved per module as some modules might have more problems than others). Please note that Concept Check questions **will occur in required videos** and so you should also watch the required videos to obtain full marks on these problems. Videos must be watched from within the browser (**not** on YouTube) in order to activate the questions. As you will have at least 2 weeks to do every module, we will **not** be accepting doctor's notes for missed module work.

*Progress:* There is a progress tab that you can find on edX to let you know how you are doing in the quizzes and Concept Check questions.

*Assignments:* Assignments will be submitted to MarkUs through our online platform. Once you submit an assignment to MarkUs, you will receive an email consisting of basic tests that you passed or failed. Students should check their basic tests email to ensure that the code meets the specification exactly. We will not accept submissions that do not match our test output exactly. Assignments are weighted evenly. We will also only take your best 8 assignments of the first 9 assignments so you can miss a week if your workload becomes too onerous.

*Final Project:* There will be a final project due Wednesday December 16th, 2020 at 10:00am ET. More details to come at the end of the term. Note: The Final Project cannot be dropped and must count towards your final grade. Remark requests for assignments can be made up to 2 weeks after the assignment has been returned.

*Missed Assignments:* **There will be no extensions on assignments and late assignments will not be accepted!** Make sure you understand what time zone you are in and when our due dates are in Eastern Time. If sick, please email our ISC a sick note to discuss alternate arrangements. Reweighting of assignments is not automatic even with a valid doctor's note and is up to the sole discretion of the instructor to allow for reweighting. We will only accept doctor's notes on at most 3 assignment components so make sure you are on top of your studies.

*Saving Work:* When you press on the **Run Code** button or the **Submit Code** button, your work will save. Please make sure you do this often! There is often no recourse if you fail to save your work so please run your code often!

## Policies

### Assignments:

Assignment solutions are to be submitted using MarkUs by their specified due date and time. Late submissions will not be accepted.

### Academic Integrity:

All course work is to be done individually. The penalty for plagiarism is an assigned mark of zero on the assignment question or test and a deduction of 5% from the final course grade, consistent with School of Computer Science and Faculty of Mathematics policy. In addition, a letter detailing the offense is sent to the Associate Dean of Undergraduate Studies, meaning that subsequent offenses will carry more severe penalties, up to suspension or expulsion. To avoid inadvertently incurring this penalty, you should discuss assignment issues with other students only in a very broad and high-level fashion. Do not take notes during such discussions, and avoid looking at anyone else's code, on screen or on paper. If you find yourself stuck, contact an instructional support assistant or instructor for help, instead of getting the solution from someone else. When trying to deal with difficulties, do not consult books other than the textbook, or any Web sources, unless explicitly authorized to do so.

### Assignment Grade Appeals:

If you have problems with the marking of an assignment, please send the instructional support assistants an email ([cs116@uwaterloo.ca](mailto:cs116@uwaterloo.ca)) within two weeks of the date the assignment was made available on MarkUs. The email must include your name, student number, Quest user ID, and assignment number. We also require that you list the questions you feel were marked incorrectly, and, for each of those questions, why you feel your mark should be changed. Please be aware that the assignment will be remarked in its entirety.

## Mental Health Resources

**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](mailto: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](mailto: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.

## University-Mandated Statement on Policies

**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](#) for more information.]

**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](#). When in doubt, please be certain to contact the department's administrative assistant who will provide further assistance.

**Discipline:** A student is expected to know what constitutes academic integrity to avoid committing an academic offence, and to take responsibility for his/her actions. [Check [the Office of Academic Integrity](#) for more information.] 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 instructor, academic advisor, or the undergraduate associate dean. For information on categories of offences and types of penalties, students should refer to [Policy 71, Student Discipline](#). For typical penalties, check [Guidelines for the Assessment of Penalties](#).

**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](#).

**Note for students with disabilities:** [AccessAbility Services](#), 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 AccessAbility Services at the beginning of each academic term.

**MOSS:** MOSS (Measure of Software Similarities) is used to compare student assignments to ensure academic integrity.

**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).