

CAS CS 111: Introduction to Computer Science I

Boston University, Spring 2024

Syllabus

Description: The first course for computer science majors and anyone seeking a rigorous introduction. Develops computational problem-solving skills by programming in the Python language, and exposes students to variety of other topics from computer science and its applications.

This course fulfills a single unit in each of the following BU Hub areas: Quantitative Reasoning II, Creativity/Innovation, Critical Thinking. **No prerequisites.**

Important: CS 111 is a time-consuming and demanding course that is primarily intended for students who plan to take more advanced computer science courses. **You should *not* take the course if you have other major time commitments, and you should *not* take it primarily for the purpose of fulfilling Hub areas.** Other options include CS 101, CS 103, CS 105, CS 108, and DS 100.

Instructors

A1: David G. Sullivan, Ph.D. (dgs@bu.edu, CDS 809, 665 Commonwealth Ave.)

D1: Aaron Stevens (azs@bu.edu, HAR 543, 595 Commonwealth Ave.)

See the course website for instructor, TF, TA and CA office hours.

Course Facilitator: Edwyn Song (esong501@bu.edu)

Teaching Fellow and Teaching Assistants (TAs)

Manuela De La Nuez (mdl@bu.edu)

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Abhinit Sati (abhinit@bu.edu)

Course Assistants (CAs)

We are fortunate to have a number of undergraduate course assistants (CAs) as members of the course staff. They will be assisting you in the labs and holding office hours each week. See the course website for their names and contact info.

Lectures and Labs

lectures: section A1: MWF, 10:10-11:00 am, HAR 105

section D1: MWF, 1:25-2:15 pm, CAS B12

lab: a weekly session; see your schedule for the time and location

Important: You must also be able to take the midterm exams, which will be held on two Wednesday evenings (2/28 and 4/3) from 6:30-7:45 p.m. in locations to be announced. We are not scheduled to meet on any other Wednesday evenings.

Course Website: <http://www.cs.bu.edu/courses/cs111>

In addition, some course materials will be posted [Blackboard](#).

Requirements and Grading

1. Weekly problem sets and final project (25% of the final grade)
2. Exams: two midterm exams (30%) and a final exam (35%)
3. Participation (10%; see below)

To pass the course, you must have a passing average on the problem sets and a passing average across the three exams.

Collaboration Policy

You are strongly encouraged to collaborate with one another in studying the lecture materials and preparing for the exams. Problem sets will include:

- *individual-only* problems that you must complete on your own
- *pair-optional* problems that you may complete alone or with a partner.

For both types of problems, you may discuss ideas and approaches with others (provided that you acknowledge this in your solution), but such discussions should be kept at a high level and should not involve actual details of the code or of other types of answers. **You must complete the actual solutions on your own** (or, in the case of a pair-optional problem, with your partner if you choose to use one).

Rules for working with a partner on pair-optional problems:

- You may *not* work with more than one partner on a given assignment. (However, you are welcome to switch partners between assignments.)
- **You may *not* split up the work and complete it separately.**
- **You must work together** (at the same computer or via a Zoom meeting) for all problems completed as a pair, and your work must be a collaborative effort.
- You and your partner must *both* submit the same solution to each problem that you did as a pair, and you must clearly indicate that you worked on the problem as a pair by putting your partner's name at the top of the file.

Academic Misconduct

We will assume that you understand BU's Academic Conduct Code:

<http://www.bu.edu/academics/policies/academic-conduct-code>

You should also carefully review the CS department's page on academic integrity:

<http://www.bu.edu/cs/undergraduate/undergraduate-life/academic-integrity>

Prohibited behaviors include:

- copying all or part of someone else's work, even if you subsequently modify it; this includes cases in which someone tells you what to write for your solution
- viewing all or part of someone else's work (with the exception of work that you and your partner do together on a pair-optional problem)
- showing all or part of your work to another student (with the exception of work that you and your partner do together on a pair-optional problem)
- giving another student access to your laptop unless you monitor their usage
- consulting solutions from past semesters, or those found online or in books
- using ChatGPT or other forms of generative AI when writing code or solving other types of problems as part of your work on the homework assignments
- posting your work where others can view it (e.g., online), even after you complete the course

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- receiving assistance from others or collaborating with others during an exam, or consulting materials except those that are explicitly allowed.

Incidents of academic misconduct will be reported to the Academic Conduct Committee (ACC). The ACC may suspend/expel students found guilty of misconduct. ***At a minimum, students who engage in misconduct will have their final grade reduced by one letter grade (e.g., from a B to a C).***

Course Materials

- **Required:** CS 111 Coursepack. This contains all of the lecture notes for the course. More detail will be provided in class and in Lab 0.
- **Optional:** *CS for All* by Alvarado, Dodds, Kuenning, and Libeskind-Hadas (Franklin Beedle, 2019). This book is *not* required.
- **Required:** We will be using the Top Hat Pro platform. More detail will be provided in class.

Other Policies

Laptops: Students taking CS courses are expected to have a laptop capable of running a currently supported version of Microsoft Windows, Mac OS X, or Linux. See this page for more info: <https://www.bu.edu/cs/undergraduate/undergraduate-life/laptops>

Late problem sets: Problem sets must be submitted by the date and time listed on the assignment (typically by 11:59 p.m.). There will be a 10% deduction for submissions up to 24 hours late. **We will not accept any homework that is more than 24 hours late.** Plan your time carefully, and don't wait until the last minute so you will have time to ask questions and obtain assistance from the course staff.

Pre-lecture preparation: To prepare for lecture, you will typically be required to watch one or two short videos and to complete an online quiz on Top Hat. Your work on these quizzes will not typically be graded for correctness, but it should demonstrate that you have adequately prepared for lecture. The pre-lecture quizzes must be submitted by the specified date and time; **late submissions will not be accepted.**

The *participation* portion of your grade will be based on your completion of the pre-lecture quizzes and in-lecture questions on Top Hat, and on your consistent participation in the lab sessions. You will receive full credit for participation if you earn at least 85% of the points on Top Hat and if you participate in at least 85% of the lab sessions. If you earn x% of the Top Hat points or participate in x% of the lab sessions for a value of x that is less than 85, you will get x/85 of the possible points.

Absences: The above participation policy is designed to allow for occasional absences due to illness or other special circumstances – including ones stemming from isolation for Covid. We will be recording the lectures and making the recordings available to everyone in the class. If you need to miss a lecture for any reason, you should simply watch the recording for that lecture as soon as possible after it is posted. In addition, you should keep up with the pre-lecture tasks and the current assignments. **Please do not email your instructor for absences of this type.**

The final exam will replace your lowest problem-set grade if doing so helps your final grade. (The final-project grade *cannot* be replaced.) The final exam will also replace your lowest midterm-exam grade if doing so helps your final grade. Regardless of

whether any such replacements occur, the final exam itself will always count for at least 35% of the final grade.

The final grades are *not* curved. The performance of the class as a whole is taken into account in assigning letter grades, but this can only improve your grade, not harm it.

Extensions and makeup exams will only be given in *documented* cases of serious illness or other emergencies. You cannot redo or complete extra work to improve your grade. Incompletes will not be given except in extraordinary circumstances.

Schedule (tentative)

week	lecture dates	topics, exams, assignments, and special dates
0	1/19	Course overview and introduction <i>No labs this week.</i>
1	1/22, 1/24, 1/26	Getting started in Python Data types and expressions Strings and lists A first look at functions Problem Set 0 (all) due on 1/28
2	1/29, 1/31, 2/2	Making decisions (conditional execution) Functions (cont.) Local and global variables; the runtime stack Recursion <i>1/31: last day to add a class</i> Problem Set 1, part I due on 2/1 Problem Set 1, part II due on 2/4
3	2/5, 2/7, 2/9	Recursion (cont.) List comprehensions Recursive design Problem Set 2, part I due on 2/8 Problem Set 2, part II due on 2/11
4	2/12, 2/14, 2/16	Lists of lists; encryption and decryption Algorithm design Representing information Problem Set 3, part I due on 2/15 Problem Set 3, part II due on 2/18
5	2/21, 2/23	Binary addition Gates and circuits Minterm expansion <i>No lecture on 2/19 (Presidents' Day)</i> <i>Labs will be held; Wed. is a Monday schedule</i> <i>2/22: last day to drop without a 'W'</i> Problem Set 4, part I due on 2/22 Problem Set 4, part II due on 2/25

6	2/26, 2/28, 3/1	Arithmetic circuits Loops and imperative programming Cumulative computations Midterm 1 on 2/28 Problem Set 5, part I due on 3/3
7	3/4, 3/6, 3/8	Loops (cont.); design using loops Nested loops Problem Set 5, part II due on 3/7
		<i>Spring break</i>
8	3/18, 3/20, 3/22	References; mutable vs. immutable data 2-D lists Object-oriented programming File processing Problem Set 6, part I due on 3/21 Problem Set 6, part II due on 3/24
9	3/25, 3/27, 3/29	Classes: creating your own types of objects Dictionaries <i>3/29: last day to drop a class with a 'W'</i> Problem Set 7, part I due on 3/28 Problem Set 7, part II due on 3/31
10	4/1, 4/3, 4/5	Classes (cont.) Midterm 2 on 4/3 Problem Set 8 (all) due on 4/7
11	4/8, 4/10, 4/12	Inheritance Games and AI Overview of the final project Problem Set 9, part I due on 4/11 Problem Set 9, part II due on 4/14
12	4/17, 4/19	Finite-state machines <i>No lecture on 4/15 (Patriots' Day)</i> <i>No labs this week</i> Final-project milestone due on 4/21
13	4/22, 4/24, 4/26	Finite-state machines (cont.) Algorithm efficiency Problem Set 10 due on 4/25
14	4/29, 5/1	Algorithm efficiency (cont.) Problem "hardness"; Course wrap-up Final project due on 4/30 <i>5/2-5/3: Study period</i>
15		Final exam: time and date TBD Please wait until your instructor informs you of the date before you make any travel plans. Make sure that you are available for the entire exam period – up to and including Friday evening, May 10!