CAS CS 111: Introduction to Computer Science I
Boston University, Fall 2022

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. Carries MCS divisional credit in CAS. 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 intend 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, less time-consuming options include CS 101, CS 103, CS 105, CS 108, and DS 100.

Instructors
A1/C1: David G. Sullivan, Ph.D. (dgs@bu.edu)
B1: Umang Desai (utdesai@bu.edu)
D1: Harrison Richmond (hrchmnd@bu.edu)
See the course website for instructor, TA and CA office hours.

Teaching Assistants (TAs)
Farid Karimli (faridkar@bu.edu)   Ruby Price (rubyp@bu.edu)
Janavi Kasera (jkasera@bu.edu)   Edwyn Song (esong501@bu.edu)
Risheet Nair (risheetn@bu.edu)   Michael Yue (yuem23@bu.edu)
Jenna Peters (jkpeters@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
           section B1: MWF, 11:15 am-12:05 pm
           section C1: MWF, 12:20-1:10 pm
           section D1: MWF, 1:25-2:15 pm
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 (10/19 and 11/16) from 6:30-7:45 p.m. We are not scheduled to meet on any other Wednesday evenings.

COVID-19-Related Expectations
To promote a safe learning environment, students must observe current University policies: https://www.bu.edu/shs/covid-19

Course Website: http://www.cs.bu.edu/courses/cs111
In addition, announcements and some course materials will be posted Blackboard.

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

To pass the course, you must earn a passing grade on each of components 1 and 2.

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)
- consulting solutions from past semesters, or those found online or in books
- posting your work where others can view it (e.g., online)
- 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 30% 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	9/7, 9/9	*No labs this week* Course overview and introduction Getting started in Python Data types and expressions *No labs this week*
1	9/12, 9/14, 9/16	Strings and lists A first look at functions Making decisions (conditional execution) **Problem Set 0 (all) due on 9/18**
2	9/19, 9/21, 9/23	Functions (cont.) Local and global variables; the runtime stack Recursion *9/19: last day to add a class* **Problem Set 1, part I due on 9/22** **Problem Set 1, part II due on 9/25**
3	9/26, 9/28, 9/30	Recursion (cont.) List comprehensions Recursive design **Problem Set 2, part I due on 9/29** **Problem Set 2, part II due on 10/2**
4	10/3, 10/5, 10/7	Lists of lists; encryption and decryption Algorithm design Representing information **Problem Set 3, part I due on 10/6** **Problem Set 3, part II due on 10/9**
5	**10/11**, 10/12, 10/14	Binary addition Gates and circuits Minterm expansion *No lecture on 10/10 (Indigenous Peoples' Day)* *Lecture on 10/11 (Mon. schedule)* *No labs this week* *10/11: last day to drop without a 'W'* **Problem Set 4, part I due on 10/13** **Problem Set 4, part II due on 10/16**

6	10/17, 10/19, 10/21	Arithmetic circuits and modular design Loops and imperative programming Cumulative computations **Midterm 1 on 10/19 from 6:30-7:45 p.m.**
7	10/24, 10/26, 10/28	Loops (cont.); design using loops Nested loops **Problem Set 5, part I due on 10/27** **Problem Set 5, part II due on 10/30**
8	10/31, 11/2, 11/4	References; mutable vs. immutable data 2-D lists Object-oriented programming File processing **Problem Set 6, part I due on 11/3** **Problem Set 6, part II due on 11/6**
9	11/7, 11/9, 11/11	Classes: creating your own types of objects Dictionaries **Problem Set 7, part I due on 11/10** **Problem Set 7, part II due on 11/13**
10	11/14, 11/16, 11/18	Classes (cont.) *11/14: last day to drop a class with a 'W'* **Midterm 2 on 11/16** **Problem Set 8 (all) due on 11/20**
11	11/21	Games and AI *No lecture on 11/23 or 11/25 (Thanksgiving)* *No labs this week*
12	11/28, 11/30, 12/2	Games and AI (cont.) Inheritance Overview of the final project Finite-state machines **Problem Set 9, part I due on 12/1** **Problem Set 9, part II due on 12/4**
13	12/5, 12/7, 12/9	Finite-state machines (cont.) Algorithm efficiency and problem "hardness" **Final-project milestone due on 12/8** **Problem Set 10 due on 12/8** **Final project due on 12/11**
14	12/12	Course wrap-up *12/13-12/14: Study period*
15		**Final exam: time and date TBD** **Please wait until your instructor informs you of the date. The initial date posted by the Registrar will <u>not</u> be correct.** *Make sure that you are available for the entire exam period – up to and including Wednesday evening, December 21!*