

# Computer Systems

## CAS CS210 - Spring 2024

**Website:** <https://cs-210-infrastructure.github.io/CS210-Website/>

**Piazza:** <https://piazza.com/class/lr3vhra0lk74qt/>

**UNIX:** <https://rhods-dashboard-redhat-ods-applications.apps.shift.nerc.mghpcc.org/>

**Gradescope:** <https://www.gradescope.com/courses/697605>

**Lectures:** Tuesday and Thursday 12:30PM-1:35PM **LAW AUD**

**Discussions:** Monday: A2 8:00-8:50AM (**EPC 206**), A3 9:05-9:55AM (**EPC 206**), A4 10:10-11:00AM (**MCS B33**), A5 11:15AM-12:05PM (**MCS B33**), A6 12:20-1:10PM (**MCS B33**), A7 1:25-2:15PM (**MCS B33**), A8 2:30-3:20PM (**MCS B33**), A9 3:35-4:25PM (**CAS 214**)

Tuesday: B2 8:00-8:50AM (**CAS 214**), B3 9:30-10:20AM (**CAS 222**)

### CS210 Staff Spring 2024:

| Role               | Name                                 | Pronouns | BU Email |
|--------------------|--------------------------------------|----------|----------|
| Instructor         | Sabrina Neuman                       | she/her  | sneuman  |
| Instructor         | Preethi Narayanan                    | she/her  | pnarayan |
| Course Facilitator | Amy Feng                             | she/her  | afeng99  |
| Teaching Fellow    | Teona Bagashvili                     | she/her  | teona    |
| Teaching Fellow    | Aneesh Raman                         |          | aneeshr  |
| Teaching Assistant | Alexis (Lexi) Pfalzgraf              | she/her  | alexispf |
| Teaching Assistant | Jake Gustin                          | he/him   | gustinj  |
| Course Assistant   | Gwen Liu                             | she/they | gwenl    |
| Course Assistant   | Paula Lopez Burgos                   | she/her  | paulalb  |
| Course Assistant   | Daniel Wang                          | he/him   | dxwang   |
| Course Assistant   | Kit Chung Yan                        | he/him   | kyan     |
| Course Assistant   | Michelle Sun                         |          | mlxs     |
| Course Assistant   | Shahnawaz Fakir                      | he/him   | sfakir   |
| Course Assistant   | Jacob Stein                          | he/him   | jmstein  |
| Course Assistant   | Karla Vasquez                        |          | kkarlav  |
| Course Assistant   | Ana Julia Bortolossi de Barros Lopes |          | anajbdbl |
| Course Assistant   | Aaron Ang                            |          | aarona   |

**Midterms:** Two 75 minute in-class midterms that will be held on

- **Midterm I: February 20, 2024** and
- **Midterm II: March 26, 2024.**

**Final:** There will also be a final. Day/time TBA.

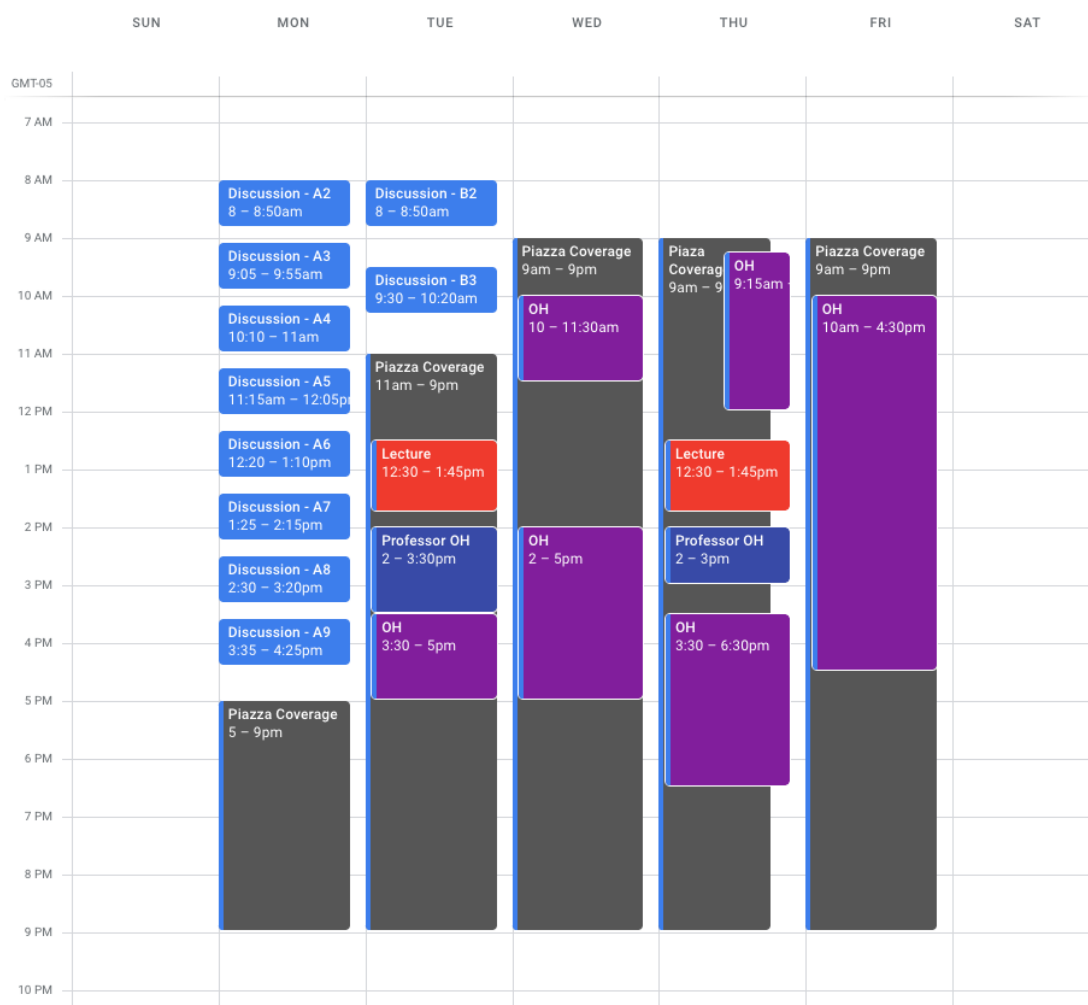
Your first written assignment is to read, sign, date (see page **14**), and submit a copy of this syllabus to Gradescope. See PS0 on Gradescope and Piazza for details.

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# 1 Weekly Schedules: Lectures, Discussions, Office Hours, Piazza

Below is a tentative weekly schedule. Any changes will be announced by course staff as needed.



## Lectures and Discussions

As per the Student Link, this course is composed of two lectures per week, as well as discussions. It is critical you attend the discussion you are registered for. If discussion rooms are in danger of exceeding capacity, then the students not officially assigned to that section will be asked to leave based on the official rosters.

## Office Hours and Piazza Coverage

In addition to the lectures and discussion, there are office hours and Piazza staff coverage.

**Office Hours:** For office hours locations and times, see the course Piazza site.

**Piazza:** Staff Piazza coverage, outside of the times noted on Piazza and the Google Calendar, will be best effort.

## Detailed Schedule & Assignment and Midterm Dates

The detailed schedule at the end of this syllabus includes assignment due dates and midterm dates. Please plan your time appropriately.

## 2 Course Description

Our goals are to: (1) provide a foundation for understanding how computer systems work from a software and hardware perspective; (2) demystify the complex layers of software and hardware that make up the world around us; and (3) learn a new set of technical competencies.

The course roughly breaks down into 3 major parts as follows.

1. **Processor Architecture:** Learning how computers compute and building up the parts of a simple CPU processor, from digital logic to an instruction set and a processor pipeline.
2. **Assembly Language and the Foundations of Software:** Learning the binary model of a computer and binary representation of software, through assembly programming.
3. **Towards High-Level Programming Languages:** Learning how we bridge the binary model and representation to a human-friendly programming model, through the “C” programming language tool-chain.

CS 210 is a principal course for computer science majors. It provides the fundamental knowledge to understand what software and hardware are. It is also the background for courses in the systems area, such as operating systems, compilers, networks, not to mention more advanced courses in computer architecture.

## 3 Prerequisites

This course assumes that students have a solid background in programming concepts from CAS CS 111 and CS 112. CS 111 and CS 112 are required. CS 131 or MA 293 is important for the material on Boolean logic and data representation. We will also build upon the Boolean circuits and finite state machines (FSMs) introduced in CS 111.

## Computer Requirements

This course requires that you have a laptop on which you can access the internet using the Google Chrome web browser. If your computer breaks, then Information Services & Technology can help you with a temporary computer while you arrange a replacement.

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>

## 4 Course Reading Materials

**MIT-OCW Online:** The processor architecture portion of the class is based on course material

posted on MIT's OpenCourseWare (OCW) website for 6.004 Computation Structures, as taught in Spring 2009. Students may find the detailed lecture notes from Spring 2017 useful.

**Notes:** <https://ocw.mit.edu/courses/6-004-computation-structures-spring-2017>

**UC-SLS Online:** This material is under construction but we will refer to it where possible, "Under the Covers: The Secret Life of Software".

**Textbook:** <https://cs-210-infrastructure.github.io/UndertheCovers/textbook>

**Notes:** <https://cs-210-infrastructure.github.io/UndertheCovers/lecturenotes>

**CPAMA Text:** K.N. King, "C Programming: A Modern Approach", Second Edition, W. W. Norton & Company, 2008.

Three other books you might find useful are:

Optional: R. Nigel Horspool, "C Programming in the Berkeley Unix Environment", 1987.

Optional: Brian W. Kernighan and Rob Pike, "The UNIX Programming Environment", Prentice Hall, 1984. (Another Classic Text).

**CSAPP Text:** Randal E. Bryant and David R. O Hallaron, <http://csapp.cs.cmu.edu/>, "Computer Systems: A Programmer's Perspective", 3rd. Prentice Hall, 2016, ISBN-13: 978-0-13-610804-7 (A text we used to use for this class)

## 5 Organization of Online Course Resources

1. Course website: <https://cs-210-infrastructure.github.io/CS210-Website/>

2. Piazza site: <https://piazza.com/class/lr3vhra0lk74qt/>

The Piazza site will be our primary means of communication through the semester, including:

- posting announcements and updates to the weekly schedule
- posting class materials
- posting links to assigned readings
- messaging: A place to post questions and answers (do not use email). See details below.

3. Gradescope: <https://www.gradescope.com/courses/697605>

We will use gradescope for submission and grading of assignments and exams. For programming portions of assignments we will exploit gradescope and github classroom (see below) integration. You must upload your assignments to gradescope from the matching github classroom repository.

4. UNIX Development Environment: <https://rhods-dashboard-redhat-ods-applications.apps.shift.nerc.mghpcc.org/>

As part of the online textbook material, we will be using an online service to do all of our programming and exploratory work. You will need to follow the link and login with your BU credentials. See Piazza and the UCSLS textbook for information about how to use the environment.

5. GitHub Classroom: <https://classroom.github.com/classrooms/156019451-cs-210-spring-2024-classroom>

We will be using git repositories for all assignments in this class. Each assignment will be a unique repository for you to manage and conduct your work. We will post an invitation link on Piazza for each assignment that you will need to follow and accept. If you do not have a [github.com](https://github.com) account, you will need to create one. Additionally, you will need to do a one-time registration to the github classroom. Doing this setup will be part of the first assignment. Please post to Piazza if you have any questions or difficulties.

## 6 How to Communicate with Course Staff: Piazza

Piazza is a service we offer to ensure efficient and centralized communication. We have purchased and set up a course Piazza site which can be accessed here:

<https://piazza.com/class/lr3vhra0lk74qt/>.

During the semester, we might make changes in the syllabus, schedule, or course policy. Changes will be posted on Piazza, and the information on Piazza will be considered to supersede the information on the Syllabus pdf. **Be sure to stay up-to-date with the information on Piazza!**

Over the course of the semester the staff will use Piazza to post: office hours information and possible changes; links to reading; links to lecture presentations/notes; assignment materials and links; discussion materials and links; additional resources; exam prep materials; and solutions to assignments and exams when appropriate.

Piazza is also a place where you can post questions to the staff regarding:

- **Logistics:** Lecture, discussion, and office hour location and times.
- **Clarifications:** If after having attended lectures and discussions you are still unclear what a question on an assignment means or what is expected of you, please post.
- **Followups:** If something was discussed in lectures, discussions, or mentioned in a reading and you would like to know more, please post.
- **Guidance:** If there is a topic about computer systems that you would like guidance on or more information about, please ask.

### Seeking Help on Piazza and Guidelines

More generally, you are welcome to post questions seeking help regarding the course material. Note, however, this is not a public forum, we will moderate posts, removing or changing the visibility as needed. Please keep the following guidelines in mind.

- Be polite and considerate.
- Always search to see if the topic of your question has already been discussed.
- Piazza is not a substitute for doing the readings, attending lectures, discussions, and office hours. If you notice a question whose answer can be found in these materials, please politely direct the poster to the appropriate material.

- If you notice a question that is a repeat please help your fellow student by directing them to the prior post.
- If you notice a question that you can help with, please post a response. If you are unsure, that's OK. Just acknowledge so, and be sure to ask the staff to clarify. A good way to learn and solidify your own understanding can be to try and explain something to others.
- Do not post questions that seek solutions to assigned problems nor should you provide such answers. In general, please do not post code that relates to an assignment.
- If you are stuck:
  - Try and ask as specific a question as you can. Please don't simply post messages of the form "Help nothing works" or "I don't know what to do".
  - Explain what you have tried.
  - Describe, in as much detail as you can, what in the provided materials is confusing and does not make sense to you.
- If you have discovered something interesting that relates to the course, by all means, share it in a post.
- Piazza is not a support line to get your code/solutions debugged nor get answers to your assignments. Please refrain creating such posts.
- In general, be willing to engage in conversations which are trying to help you understand versus just get the answer.
- Ask your questions early regarding assignments. **In general do not expect staff help within eight hours of a deadline.**
- Piazza is not a public forum to discuss concerns about the course or staff. Please arrange to meet with the professor regarding these concerns. If you are not comfortable discussing your concerns with the professor, please contact the department chair.

## 7 Requirements and Grading

|                       |        |  |
|-----------------------|--------|--|
| Midterm I             | 17.5%  | February 20, 2024  |
| Midterm II            | 17.5%  | March 26, 2024   |
| Final Exam            | 25%    | A final exam will be held during the assigned examination period. The exam will be cumulative covering all material from the course. |
| Assignments           | 40%    | Several Assignments which can require both written and programming solutions   |
| (Optional) Bonus Work | Max 5% | See Bonus Work subsection below for details.   |

## Grading

Grading (except for the final exam) is done by a number of class graders, under the direct supervision of the Teaching Fellow(s) and the professors. If you have an issue with a grade (homework or exam), please contact the Teaching Fellow(s). Only if the issue is not resolved to your satisfaction, please contact the professor. Note the professor may opt to re-grade the entire submission. The professor's result will be the final grade assigned for the submission (note that this value may be lower than the original score).

**NOTE: Grades must be appealed within one week of receipt.**

**NOTE: The final grades are *not* curved.**

## Incompletes, Missed Work, and Extensions

No incompletes will be given, except for reasons of dire illness shortly before the end of the course, and only if a significant amount of work has been completed (e.g., attending lectures, handing in most assignments, and attending the midterms).

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.

Course examinations are given at the instructor's discretion. A student who is unable to attend an examination should contact the instructor as early as possible prior to the examination to discuss the possibility of alternate arrangements. A student who is absent from an examination may request a makeup examination only if the examination was missed for a serious reason (such as documented illness or family emergency). Students with family emergencies should contact their academic advisor as soon as possible so that instructors can be notified. Students with serious illnesses should contact the instructors. Please be aware that special or makeup examinations will not be scheduled to accommodate a student's travel plans.

## Bonus Work

Various assignments may have bonus components. You may work on these bonus components throughout the semester. All bonuses will be due on the last day of classes. Separate submission sites will be created for each bonus component. At the end of the semester, a final bonus grade will be calculated. If you have met the standard grading requirements outlined above to pass the course, then the bonus grade will be added to your aggregate score. As such, the bonus components cannot help you pass the class but can improve a passing grade.

**NOTE: To be eligible for a particular bonus you must have submitted the corresponding assignment prior to the late date.**

The combined bonus score will be included into your final grade as an additional assignment. Your total bonus score can add at most 5 points (i.e., max 5%) to your final grade, as shown in the grading rubric table above.



## 8 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.
- For gradescope submission be sure to use the group submission option.

## 9 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.

Students will be contacted if any submission is flagged for academic misconduct by the course staff. Students who engage in misconduct will receive a 0 on that assignment and will have their final grade reduced by one letter grade (e.g., from a B to a C). Additionally, be aware that the Academic Conduct Committee (ACC) processes reports of academic misconduct. The ACC may suspend/expel students found guilty of misconduct.

## 10 Midterms and Exam

There will be two midterm exams and one final exam which will include all material covered from the beginning of the semester until the day of the exam. The two 75 minute midterms are held during the semester on:

**February 20, 2024 and March 26, 2024.**

It is your responsibility to ensure that you can attend the midterms. The final will be held during the assigned exam slot (see student link). Please plan your work and travel plans accordingly.

### Midterm and Exam Conduct

- During exams you are not permitted to wear any hat with a brim, such as a baseball hat, that could obscure the proctor from seeing your eyes.
- Course staff will direct you to where you will sit for exams. All seating assignments are at the course staff's discretion.
- If, during an exam, you are found consulting any other material than what is provided or specified, it will be considered as a possible case of academic misconduct. This includes using electronic devices and encompasses answering calls or messaging.

## 11 COVID-19/Health Procedures

To promote a safe learning environment, students must adhere to the current University policies. At the time of writing the current policies can be found here:

<https://www.bu.edu/shs/covid-19/>.

## 12 Assignments

A core aspect to understanding computer systems and becoming distinguished programmers comes from the doing. To this end, doing the assignment is a critical aspect to this course. While it might be tempting to immediately search for code, don't do it! Please ask us instead. We are here to help you learn. The assignments are intended to engage you personally with the material, don't squander that opportunity and don't fall prey to plagiarism. Ask questions in the lecture, ask questions during discussions, ask questions during office hours, ... ask questions!

## Schedule and Logistics

There will be six assignments referred to as problem sets; PS0 to PS5. Most assignments are broken down into two parts; Part A written and Part B programming. Both parts will be provided to you as a private git repository that contains the files related to the assignment. Your solutions to both parts A and B will be submitted, graded and returned back to you on gradescope.

The first assignment, PS0, is an introductory assignment to make sure that you are setup on all the course infrastructure and you will need to complete both parts **prior** to the first discussion. Please see posted information on Piazza.

The remaining five assignments, PS1 to PS5, form the core assignments for the class. The due dates can be found in the detailed calendar at the end of this document. Both parts A and B of a problem set will be released well in advance. Part A, the written component, will generally be due first, while the programming portion, Part B will be generally due one week later. All assignments are due at 11:59 PM ET. Please consult the detailed weekly syllabus for the schedule. If there are any changes to the assignment schedule, we will post updates on Piazza.

**NOTE: All assignments are due at 11:59 PM ET on the date listed.**

**NOTE: We have provided a detailed schedule, stating when office hours and staff piazza coverage are, so plan your time appropriately.**

Almost all of the computer based work you need to do to complete either part A or part B of a problem set should be done in the provided online UNIX environment. Each problem set should contain a README.md that will provide the general instructions for the assignment.

## Written

Within a particular problem set you will find a pdf that forms part A of the problem set (the README.md will clarify which file is the pdf). This is the written component and you should provide all your answers in the space provided on the pdf.

You will need to download the pdf to your laptop and complete it as directed. You will submit your updated pdf to a gradescope submission site that we will create and post a link to.

PS0, part A, will walk you through what needs to be done for written assignments. In general, you can either update a copy of the pdf and submit that or you may print out the pdf and work on paper. If you choose to do the latter you will need to scan, or take pictures, of your paper copy to upload to gradescope.

## Programming

The repository for the the programming component will form part B of the problem set. To work on the programming portion, you will need to create a local copy of the repository in the provided online UNIX environment. As you work on part B you may need to both update files and add new ones. All changes and new files must be “committed and pushed” back to your master repository. To do this, you will need to use the appropriate git commands.

**WARNING: The files and directories of the online UNIX environment are NOT permanent. If you disconnect or do not actively use your server it will be rebooted and**

**all the files will be deleted. To permanently save your work you MUST frequently use git to “commit and push” copies back to your master git repository.**

Part B of PS0 will help you get bootstrapped on what you generally will need to do for part B of problem sets. A separate gradescope submission site will be created for part B. You will need to submit a copy of your main git repository on github classroom to this submission site. Don’t forget to ensure that it is updated correctly with your latest version.

The programming portion of an assignment will be evaluated both with automatic and manual grading. For each part B, we will provide you the same script that the autograder will run on your solution to test it. You should inspect this script to help you understand how your solution should work and what we expect. For the manual portion, we will inspect your code and repositories.

## **Repository Histories**

Every time you git “commit and push” changes to your assignment repository a timestamped record is created. The “history” of your changes documents exactly when and what work you have done. We will inspect your histories to evaluate your effort and work. We will evaluate the messages, number, timing and contents of your commits.

**NOTE: If we do not observe a repository history that is indicative of a realistic effort in a reasonable time frame to produce a solution, then we may flag your assignment for academic misconduct and assign a zero for the auto-graded portion of the grade.**

With this in mind, we recommend you start early and frequently commit and push your changes to your master repository. Remember, you do not have to have things in a working/solved state when you commit and push. Rather, you should treat it more like the saving work and documenting what you have tried and where you are. So do it often!

## **Late Policy**

Problem sets must be submitted by the date and time listed on the assignment (typically by 11:59 PM ET, as stated earlier).

**NOTE: There will be a 10% deduction for submissions up to 24 hours late.**

**NOTE: 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.

# **13 Office Hours, Lectures, and Discussions**

## **Office Hours**

The teaching staff will hold office hours. The purpose of the office hours is to answer specific questions or clarify specific issues. Office hours are not to be used to fill you in on a class you skipped or to explain entire topics. Please come to class and to your discussion sessions.

**NOTE: To reach the staff at times other than office hours, you MUST use Piazza. Staff will NOT guarantee response to messages outside of Piazza (e.g., email).**

**NOTE: As per the schedule, please do not expect staff responses outside of the Piazza staff coverage hours.**

## Lectures

The topics of the lectures build on each other. You will find it very difficult with later topics if you do not ensure understanding of a preceding topic. As such, we encourage you to reach out to the staff during discussions and office hours to clarify your understanding. Engage in Piazza discussions. If you are still feeling lost, send us a private message on piazza to find a time to chat.

Lectures may have pointers to readings, which will be communicated by the course staff. You should read this material prior to the lecture. **MIT-OCW** refers to MIT OpenCourseWare for 6.004 in Spring 2017, **UC-SLS** refers to the online text “Under the Covers: The Secret Life of Software”, and **CPAMA** refers to “C Programming: A Modern Approach”.

Lectures, however, will not be restricted to text material or what is on online versions of the lecture slides. Lectures may cover additional or alternative material.

**NOTE: You will be responsible for all material covered in the lectures.**

## Discussions

Students are expected to attend the weekly discussion section that they have been assigned to. Discussions are a critical component of this course. In addition to the discussion, the Teaching Fellows and Course Assistants will hold office hours.

## 14 Use of AI-Based and Other Online Tools

This course assumes that work submitted by students - all process work, drafts, brainstorming artifacts, final works - will be generated by the students themselves, working individually or in groups as directed by class assignment instructions. Artificial intelligence (AI) language models, such as ChatGPT, and online assignment help tools, such as Chegg, are examples of online learning support platforms and **they can NOT be used for any assignment or exam in this course.**

The following actions are **prohibited** in this course:

- Submitting all or any part of an assignment statement to an online learning support platform;
- Incorporating any part of an AI generated response in an assignment;
- Using AI to brainstorm, formulate arguments, or template ideas for assignments;
- Using AI to summarize or contextualize source materials;
- Submitting your own work for this class to an online learning support platform for iteration or improvement.

The purpose of this course is for you to learn more about computer systems, which is foundational information for any computer scientist. While prompt engineering is a valuable skill in today's world, this course is not the place for it. Any usage of AI or assignment help tools identified by the course staff will be considered as Academic Misconduct, and the same consequences will apply.

**NOTE: Again, use of ChatGPT and other AI/online tools is NOT permitted in CS210.**

**NOTE: In general, do not turn to the internet, social media, or any other sources if you are feeling overwhelmed. Staff are available at discussions, office hours, and on Piazza. We are here to teach and help you succeed. There will be zero tolerance for plagiarism (see Academic Misconduct above).**

## Signature

Please indicate that you read and understood the policies and expectations in the syllabus.

**Name:** \_\_\_\_\_

**BUID:** \_\_\_\_\_

**Date:** \_\_\_\_\_

## 15 Appendix: Detailed Course Schedule

Below is a tentative schedule. Any changes will be announced by course staff as needed.

|      | Date     | Topic        | Lecture  | PSets Out | PSets Due | Notes   |
|------|----------|--------------|--|-----------|-----------|---|
| L1   | R Jan 18 | Introduction | Course Overview and Introduction                           |           |           |   |
|      | F Jan 19 |              |  | PS0: OUT  |           |   |
|      | M Jan 22 |              | DIS1: Terminal Commands, Version Control with GIT          |           |           |   |
| L2   | T Jan 23 | Architecture | The Digital Abstraction and Combinational Logic            |           |           |   |
| L3   | R Jan 25 | Architecture | Sequential Logic and Finite State Machines                 |           |           |   |
|      | F Jan 26 |              |  | PS1: OUT  | PS0: DUE  |   |
|      | M Jan 29 |              | DIS2: Architectural Simulation Tools                       |           |           |   |
| L4   | T Jan 30 | Architecture | Designing an Instruction Set Architecture                  |           |           | Jan 31: Last Day to Add Standard Courses                        |
| L5   | R Feb 1  | Architecture | Machine Language, Assemblers, and Compilers                |           |           |   |
|      | F Feb 2  |              |  |           | PS1A: DUE |   |
|      | M Feb 5  |              | DIS3: GDB 1: Intro: Starting and Basics                    |           |           |   |
| L6   | T Feb 6  | Architecture | Building a Simple Processor: The Beta                      |           |           |   |
| L7   | R Feb 8  | Architecture | From The Beta to Modern CPUs                               |           |           |   |
|      | F Feb 9  |              |  | PS2: OUT  | PS1B: DUE |   |
|      | M Feb 12 |              | DIS4: Practice Exam Review                                 |           |           |   |
| L8   | T Feb 13 | Assembly     | Assembly Programming Introduction                          |           |           |   |
| L9   | R Feb 15 | Assembly     | Writing Some Simple Assembly Programs                      |           |           |   |
|      | F Feb 16 |              |  |           |           |   |
|      | M Feb 19 |              | Presidents' Day Holiday, Classes Suspended                 |           |           | Feb 19: Presidents' Day Holiday, Classes Suspended              |
| Quiz | T Feb 20 |              | Midterm I: In Class  |           |           |   |
|      | W Feb 21 |              | DIS5: GDB 2: Executables and Exploring CPU Instructions    |           |           | Feb 21: Substitute Monday Schedule of Classes                   |
| L10  | R Feb 22 | Assembly     | Assembly: Operations and Data Types                        |           |           | Feb 22: Last Day to Drop Standard Courses (without a "W" grade) |
|      | F Feb 23 |              |  |           | PS2A: DUE |   |
|      | M Feb 26 |              | DIS6: Assembly 1: Conditionals, Loops, Multiple Sources    |           |           |   |
| L11  | T Feb 27 | Assembly     | Assembly: Program Anatomy I                                |           |           |   |
| L12  | R Feb 29 | Assembly     | Program Anatomy II: Functions                              |           |           |   |
|      | F Mar 1  |              |  | PS3: OUT  | PS2B: DUE |   |
|      | M Mar 4  |              | DIS7: Assembly 2: Strings, Data Structure, Standard Output |           |           |   |
| L13  | T Mar 5  | Assembly     | Program Anatomy III: Code as Data                          |           |           |   |
| L14  | R Mar 7  | Assembly     | Program Anatomy IV: Data Structures                        |           |           |   |
|      | F Mar 8  |              |  |           |           |   |
|      |          |              | Spring Recess, Classes Suspended                           |           |           | Mar 9 - Mar 17: Spring Recess, Classes Suspended                |
| L15  | T Mar 19 | OS           | OS Introduction and Preliminaries                          |           |           |   |
| L16  | R Mar 21 | OS           | I/O, Process Control and Credentials                       |           |           |   |
|      | F Mar 22 |              |  | PS4: OUT  | PS3: DUE  |   |
|      | M Mar 25 |              | DIS8: Practice Exam Review                                 |           |           |   |
| Quiz | T Mar 26 |              | Midterm II: In Class                                       |           |           |   |
| L17  | R Mar 28 | Assembly     | Assembly Using I/O and the OS                              |           |           | Mar 29: Last Day to Drop Standard Courses (with a "W" grade)    |
|      | F Mar 29 |              |  |           |           |   |
|      | M Apr 1  |              | DIS9: Virtual Memory and Caching                           |           |           |   |
| L18  | T Apr 2  | Architecture | Virtual Memory   |           |           |   |
| L19  | R Apr 4  | Architecture | Processor Caches   |           |           |   |
|      | F Apr 5  |              |  | PS5: OUT  | PS4: DUE  |   |
|      | M Apr 8  |              | DIS10: C and Assembly                                      |           |           |   |
| L20  | T Apr 9  | C            | Fundamentals of C Programming                              |           |           |   |
| L21  | R Apr 11 | C            | Functions & Arrays   |           |           |   |
|      | F Apr 12 |              |  |           | PS5A: DUE |   |
|      | M Apr 15 |              | Patriots' Day Holiday, Classes Suspended                   |           |           | Apr 15: Patriots' Day Holiday, Classes Suspended                |
| L22  | T Apr 16 | C            | C Data Types   |           |           |   |
| L23  | R Apr 18 | C            | C Pointers   |           |           |   |
|      | F Apr 19 |              |  |           | PS5B: DUE |   |
|      | M Apr 22 |              | DIS11: Linked List in C                                    |           |           |   |
| L24  | T Apr 23 | C            | C Structures, Unions, Enums, Bitwise Operations            |           |           |   |
| L25  | R Apr 25 | C            | Dynamic Memory Allocation                                  |           |           |   |
|      | F Apr 26 |              |  |           |           |   |
|      | M Apr 29 |              | DIS12: Practice Final Exam Review                          |           |           |   |
| L26  | T Apr 30 | Conclusion   | What's Next?   |           |           |   |

## 16 Appendix: Resources for Students

### Disability & Access Services

Students with documented disabilities, including learning disabilities, may be entitled to accommodations intended to ensure that they have integrated and equal access to the academic, social, cultural, and recreational programs the university offers. Accommodations may include, but are not limited to, additional time on tests, staggered homework assignments, note-taking assistance. If you believe you should receive accommodations, please contact the Office of Disability & Access Services to discuss your situation. This office can give you a letter that you can share with instructors of your classes outlining the accommodations you should receive. The letter will not contain any information about the reason for the accommodations. If you already have a letter of accommodation, you are encouraged to share it with your instructor as soon as possible.

Disability & Access Services

25 Buick Street, Suite 300

617-353-3658

[access@bu.edu](mailto:access@bu.edu)

[bu.edu/disability/](http://bu.edu/disability/)

### Educational Resource Center

The Educational Resource Center offers tutorial assistance to all undergraduate students in a range of subjects. You are encouraged to explore the resources this office can provide.

Educational Resource Center

Yawkey Center for Student Services

100 Bay State Rd, 5th floor

617-353-7077

[bu.edu/erc](http://bu.edu/erc)

### Student Health Services

Offers an array of health services to students, including wellness education and mental health services (behavioral medicine).

BU Student Health Services: [bu.edu/shs/](http://bu.edu/shs/)

Student Wellness Prevention: [bu.edu/shs/wellness/](http://bu.edu/shs/wellness/)

Behavioral Medicine Office: [bu.edu/shs/behavioral-medicine/](http://bu.edu/shs/behavioral-medicine/)

### ISSO

The International Students Scholars Office ([bu.edu/isso/](http://bu.edu/isso/)) is committed to helping international students integrate into the Boston University community, as well as answering questions and facilitating any inquiries about documentation and visas.