

# Computer Systems

## CAS CS210 - Fall 2024

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

**Piazza:** <https://piazza.com/class/m0h4ovtbak66gk/>

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

**Gradescope:** <https://www.gradescope.com/courses/842233>

**Lectures:** Tuesday and Thursday 9:30AM-10:45AM **LAW AUD**

**Discussions:** Monday (**CDS-364**): A2 8:00am-8:50am, A3 9:05am-9:55am, A4 10:10am-11:00am, A5 11:15am-12:05pm, A6 12:20pm-1:10pm, A7 1:25pm-2:15pm, A8 2:30pm-3:20pm, A9 3:25pm-4:25pm, AA 4:40pm-5:30pm, AB 5:40pm-6:30pm

### CS210 Staff Fall 2024:

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Course Assistant	Mohammed (Moe) Anwar		manwar
Course Assistant	Zexian (Jessie) Xu		jessiezx
Course Assistant	John Kim		jjk29

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

- **Midterm I: October 3, 2024** and
- **Midterm II: November 7, 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

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

CS210, 2024

	Monday	Tuesday	Wednesday	Thursday	Friday
8:00 am	Discussion A2 CDS 364				
8:15 am					
8:30 am					
8:45 am					
9:00 am	Discussion A3 CDS 364		Office Hours		Office Hours
9:15 am					
9:30 am		Lecture LAW-AUD		Lecture LAW-AUD	
9:45 am					
10:00 am	Discussion A4 CDS 364			Office Hours	
10:15 am					
10:30 am					
10:45 am					
11:00 am	Discussion A5 CDS 364				
11:15 am					
11:30 am					
11:45 am					
12:00 noon					
12:15 pm					
12:30 pm	Discussion A6 CDS 364				
12:45 pm					
1:00 pm					
1:15 pm					
1:30 pm	Discussion A7 CDS 364				
1:45 pm					
2:00 pm		Office Hours		Office Hours	
2:15 pm					
2:30 pm	Discussion A8 CDS 364				
2:45 pm					
3:00 pm					
3:15 pm					
3:30 pm	Discussion A9 CDS 364		Office Hours		
3:45 pm					
4:00 pm					
4:15 pm					
4:30 pm					
4:45 pm	Discussion AA CDS 364				
5:00 pm					
5:15 pm					
5:30 pm					
5:45 pm	Discussion AB CDS 364				
6:00 pm					
6:15 pm					
6:30 pm					
6:45 pm					
7:00 pm					

## 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

In addition to the lectures and discussion, course staff host office hours, which are an excellent way to get help and talk to course staff.

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

**If you can not make any office hour times this semester, please reach out to course staff on Piazza as early as possible.**

## 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 4 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.
4. **Improvements to System Performance:** Learning how modern systems run efficiently through using methods such as pipelining, caching, and virtual memory management.

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.

This course provides one unit of HUB Quantitative Reasoning II.

## 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 HUB Learning Outcomes

This course provides one unit of HUB Quantitative Reasoning II. The learning outcomes of this unit are met as follows:

1. Outcome 1: *Students will frame and solve complex problems using quantitative tools, such as analytical, statistical, or computational methods.*

Computer systems use a variety of algorithms, which in this course are studied through the C language. The problems are low-level (e.g., how to represent and manipulate floating-point numbers at the bit level) but complex and of far-reaching significance.

2. Outcome 2: *Students will apply quantitative tools in diverse settings to answer discipline-specific questions or to engage societal questions and debates.*

The concerns of lower-level computer hardware and software are fundamental to all of computer science, and students will apply computational tools to solve these.

3. Outcome 3: *Students will formulate, and test an argument by marshaling and analyzing quantitative evidence.*

Evidence of symbols and numerical nature is used in programming to formulate and test algorithms (=argument).

4. Outcome 4: *Students will communicate quantitative information symbolically, visually, numerically, or verbally.*

Students will communicate symbolically and numerically through the standard output of the C language.

5. Outcome 5: *Students will recognize and articulate the capacity and limitations of quantitative methods and the risks of using them improperly.*

The limitations in speed and capacity of these lower-level algorithms is an essential part of the course, and learning how these limitations play into practical applications is indeed a significant theme of the course.

## 5 Course Reading Materials

**DIS** “Dive Into Systems”, A Gentle Introduction to Computer Systems by Suzanne J. Matthews,

Tia Newhall, and Kevin C. Webb.

**Textbook:** <https://diveintosystems.org/book/>

**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.

Four 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)

**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. Students may find the detailed lecture notes useful.

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

## 6 Organization of Online Course Resources

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

2. Piazza site: <https://piazza.com/class/m0h4ovtbak66gk/>

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/842233>

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.

## 7 How to Communicate with Course Staff: Piazza

We use Piazza as our platform for centralized communication about the course. The course Piazza site can be accessed here: <https://piazza.com/class/m0h4ovtbak66gk/>.

**Staff will generally NOT respond to messages outside of Piazza (e.g., email). If you post on Piazza we will try to get back to you as soon as possible.**

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

Piazza is a great way to learn in a collaborative manner. Course staff will do as best as we can to clarify content questions as soon as possible. Students are also heavily encouraged to answer any questions that you can!

Using Piazza effectively is a skill, here are some quick tips before posting on Piazza:

- Be polite and considerate when asking and answering questions.
- Please don't post questions that seek solutions to assigned problems nor should you provide such answers. Please do not post code that relates to an assignment.
  - It is quite difficult to effectively debug over Piazza. **In general, attending office hours is the best way to receive support about issues you can not resolve in your code.**
- Double-check to see if the topic of your question has already been discussed. If you notice a question has already been answered you can use @<post number> to link the asker to the other question.
- Check to see if your question can be answered in the lecture or reading materials. Reference the specific material you have questions about using a link to the slide/chapter. Also, when answering questions, try to reference relevant lecture materials and readings.
- Ask questions as early as possible. Close to deadlines it may be hard to get quick responses to your questions.
- Write specific questions! Even if you are unsure, sharing your thought process can help get you the best answer. Explain what you have tried, your assumptions and thoughts so far, and then pose your question.
- If you have discovered something interesting that relates to the course, by all means, share it in a post!

## 8 Requirements and Grading

Midterm I	17.5%	October 3, 2024
Midterm II	17.5%	November 7, 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
Discussion Attendance Bonus	Max 1%	Attend all discussion sections (with two permitted absences), and you will receive a bonus.
(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.

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.

## **9 Collaboration Policy**

You are strongly encouraged to collaborate with one another in studying the lecture materials and preparing for the exams. Problem sets are designed to be completed on your own.

However, 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

## 10 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
- showing all or part of your work to another student
- 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.

## 11 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:

**October 3, 2024 and November 7, 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. You may be asked to move at any point during the exam.
- 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.

## 12 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/>.

## 13 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 are, so please take a look and 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.

## 14 Office Hours, Lectures, and Discussions

### Office Hours

The teaching staff will hold office hours, which is a great way to get help and meet with course staff. The purpose of the office hours is to answer specific questions or clarify specific issues. Office hours are most effective if you come prepared—attend previous lectures and discussions!

### 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. **DIS** refers to Dive into Systems, **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. **You will receive a 1% Attendance Bonus on your final grade if you attend most of the discussion sections** (you are permitted to miss two and will still receive the bonus).

## 15 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: \_\_\_\_\_

## 16 Appendix: Detailed Course Schedule

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

Date	Summary
2024-09-03	PS0 Released
2024-09-03	L1: Syllabus/Intro
2024-09-05	L2: Logic Gates
2024-09-06	PS0 Due
2024-09-09	PS1 Released
2024-09-10	L3: Arithmetic and Logic Gates
2024-09-12	L4: Control Circuits and Storage Circuits
2024-09-17	L5: Instruction Set Architecture
2024-09-19	L6: Building a Processor
2024-09-20	PS1A Due
2024-09-24	L7: Intro to x86 and Exam Review
2024-09-26	L8: Unix, Terminal and OS
2024-09-27	PS1B + PS1C Due
2024-09-30	PS2 Released
2024-10-01	L9: Github and Writing first Assembly
2024-10-03	<b>Exam 1</b>
2024-10-08	L11: Operations and Data Types
2024-10-10	L12: ASM Program 1 - Basics
2024-10-11	PS2 Due
2024-10-15	PS3 Released
2024-10-17	L13: ASM Functions and Stack
2024-10-22	L14: Code as data, data structures, IO
2024-10-24	L15: Assembly to C basics
2024-10-29	PS4 Released
2024-10-29	L16: C basics- data types, syntax, etc
2024-10-31	L17: C pointers
2024-11-01	PS3 Due
2024-11-05	L18: C Malloc
2024-11-07	<b>Exam 2</b>
2024-11-12	L20: C Arrays and Linked Lists
2024-11-14	L21: Intro to Performance and Pipelining
2024-11-15	PS4 Due
2024-11-18	PS5 Released
2024-11-19	L22: Locality and Caching
2024-11-21	L23: Cache Coherence
2024-11-26	L24: OS Virtual Memory
2024-12-03	L25: OS Paging
2024-12-05	L26: Security
2024-12-06	PS5 Due
2024-12-10	L27: Advanced Topics + Wrap Up

## 17 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  
[bu.edu/disability/](https://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](https://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/](https://bu.edu/shs/)  
Student Wellness & Prevention: [bu.edu/shs/wellness/](https://bu.edu/shs/wellness/)  
Behavioral Medicine Office: [bu.edu/shs/behavioral-medicine/](https://bu.edu/shs/behavioral-medicine/)

### ISSO

The International Students & Scholars Office ([bu.edu/isso/](https://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.