

CPSC 2500: Computer Organization

Fall 2025 - Sections 01 & 02

*The policies and schedule contained in this document are subject to change.
All links in the document are available on Canvas (Syllabus tab).*

Course Description:

Basic concepts of computer organization including data representation, digital logic, processor architecture, caching, and parallel architectures. Implementation via assembly language programming.

Instructor Information:

Eric Larson

Office: SINE 290-11

Email: elarson@seattleu.edu (please place ‘CPSC 2500’ somewhere in the subject for quicker replies)

Office Hours: 9:00-10:30am MWF (in-person), or by appointment using Bookings (can request in-person or Zoom)

Course Information:

- *Credits:* 5
- *Section 01 Class Times:* 10:55am – 12:20pm on Monday, Wednesday, and Friday in Garrand 114
- *Section 02 Class Times:* 2:05 – 3:30pm on Monday, Wednesday, and Friday in Bannan 629
- *Prerequisite:* C or better in either CPSC 1230 or CPSC 1430

This course is a required course for computer science (BSCS / general option) and computer science (BSCS / math specialization).

This course is a 2000-level course and does *not satisfy* any requirement or elective for the following: computer science (BA), computer science (BSCS / business specialization), and computer science minor.

Important Dates:

Wednesday, September 24	First day of class
Friday, October 3	No class – Mass of the Holy Spirit (both sections)
Wednesday, October 29	Midterm Exam 1
Monday, November 10	Last day to withdraw
Friday, November 21	Midterm Exam 2
Wed-Fri, November 26-28	No class – Thanksgiving Break
Friday, December 5	Last day of class
Tuesday, December 9	Section 02 Final Exam (2:00-3:50pm)
Wednesday, December 10	Section 01 Final Exam (2:00-3:50pm)

Tentative Schedule of Topics:

- Data Representation
- Digital Logic and CPU Components
- Assembly Language
- Microarchitecture
- System Architecture and Parallel Computers
- Memory Hierarchy and Caches

Course Objectives:

At the end of this course, the student should be able to:

- Express values for basic data types using machine level data representation.
- Design a simple logic circuit from a problem description.
- Develop a finite state machine from a problem description.
- Write segments of assembly code that will be produced from a given segment of code in a high-level language (e.g., C/C++) including arrays, pointers, and subroutine calls.
- Describe how instructions are executed in non-pipelined and pipelined CPU implementations.
- Describe how interrupts are processed.
- Describe how caches behave, under a variety of cache configurations, and their role in the memory hierarchy.
- Compute average memory access time and cache hit rate, under a variety of cache configurations, for a stream of data references.
- Distinguish between different parallel computer architectures.

Textbook:

No textbook is required. The following textbook is recommended:

Structured Computer Organization
Andrew S. Tanenbaum and Todd Austin
6th edition
Publisher: Pearson
ISBN: 0-13-291652-5

Reading assignments are divided into recommended reading assignments (to help comprehend the material presented in class) and supplemental reading assignments (for those interesting in seeking more information that was presented in class).

Class Website:

The class website can be found in Canvas (<https://seattleu.instructure.com/>).

Grading:

Homework Assignments *40% (6 assignments)*

There will be six homework assignments. Four assignments are written assignments, two assignments will involve assembly language programming using provided tools. Not all assignments will be weighted equally – some assignments will be worth more points than others.

Midterm Exams *30% (15% each)*

This class has two midterm exams occurring on Oct. 29 and Nov. 21. The exams are closed-book, closed-notes, and with no calculators. The ANNA programming card will be provided for both exams.

Final Exam *30%*

The final exam takes place on Dec. 9 (Sec 02) or Dec. 10 (Sec 01) from 2:00-3:50pm. The final exam is cumulative. Like the midterm exams, the final exam is also closed-book, closed-notes, and with no calculators. The ANNA programming card will be provided for the final exam.

Class participation and attendance is not required but may impact the grade if the student is near a boundary.

The following grade scale will be used:

100	93	90	87	83	80	77	73	70	67	63	60	0
A	A-	B+	B	B-	C+	C	C-	D+	D	D-	F	

At the discretion of the instructor, the course grading scale may be curved but only to reduce the requirement to receive a particular grade. For example, the requirement to receive an A may be lowered from 93% but cannot be raised to some number higher than 93%.

A grade of a C is needed to satisfy computer science major requirements. A C is also needed to take any class that requires CPSC 2500.

No extra credit will be given.

STUDENT EXPECTATIONS

Assumed Knowledge Expectations:

It is assumed that you are familiar with the following subjects:

- Logarithms and exponents
- Programming in a high-level object-oriented language (C++, Java, or C#).
- Arrays
- Pointers and dynamic memory

Workload Expectations:

Students are expected to keep up with the course material. This includes completion of the reading assignments that are posted in the lecture notes. Unless noted otherwise, you are responsible for all assigned material even if a topic was not covered during lecture.

As this is a five credit class, students should plan to spend *at least ten hours per week* outside of class. Students who need to learn or review the assumed knowledge topics above will need to spend even more time.

Students are also responsible for turning in homework in a timely fashion (refer to the *Late Homework Policy* later in this document) and, unless noted otherwise, to complete assignments individually (refer to the *Academic Integrity Policy* later in this document).

Class Announcement and Email Expectations:

Students are expected to keep up-to-date on class announcements made outside of class on a *daily* basis. All class announcements will be made on the course website via Canvas. By default, Canvas will instantly send these announcements to your SU email address. If desired, you may change the settings on Canvas to send these announcements to an alternative email address and/or to social media accounts.

It is also important to check your SU email account on a daily basis as individual emails will be sent to the student's SU email address. Also, important university announcements (such as the school closing due to inclement weather) are made in this fashion.

Class Conduct Expectations:

You are responsible for treating other students with respect and to minimize disruptions to the classroom. Examples of classroom disruptions include, but are not limited to: ringing cell phones, using cell phones and laptops in a distracting manner, arriving to class late, and leaving/reentering the classroom.

Community and Inclusion:

Seattle University has a stated commitment to diversity and inclusivity. In part, this includes an expectation that all members of our campus community treat one another with respect and care in the classroom. Actions or statements which espouse the supremacy of one group of people over another, or which marginalize any group, are not welcome in our classroom. Such attitudes are destructive to both our learning process and our community. All students in this course are welcomed and valued.

Racism, sexism, homophobia, transphobia, and other forms of discrimination have no place on our campus or in our classroom. Our class, like our campus, is one community. We teach all students, regardless of background or beliefs. All students are equally welcome and valued. Growth mindset includes our ability to grow together, to learn to be more tolerant, and to become more compassionate.

If you find that anything in our class is failing to live up to these principles (including me), I encourage you to bring this issue up using any of the following methods:

- Reporting the issue through the Office of Institutional Equity (<https://www.seattleu.edu/office-of-institutional-equity>)
- Contacting me
- Contacting the department chair
- Contacting any faculty / staff member you feel comfortable talking to; possibly your academic advisor.

Academic Resources:

If you need additional help with the course material, the following resources are available to assist that include the following:

- Communicating with the instructor via email or during office hours.
- Links provided on the course webpage.
- Learning Commons (<http://www.seattleu.edu/learningcommons/>) on the 2nd Floor of Lemieux Library provides research services and learning assistance programs.
- Internet (make sure the sources are reputable and that you are not violating the *Academic Integrity Policy*).

If you have difficulty finding help on a particular topic, please contact the instructor.

COURSE POLICIES

Some of the course policies refer to university policies. Links can be found on Canvas and at this website: <https://www.seattleu.edu/redhawk-service-center/academic-policies/>

Attendance Policy:

Attendance is strongly encouraged but does not directly impact your final grade. You are responsible for learning the material they missed from not attending a class on their own.

On exam days, attendance is required. See the *Exam Policy* for more details.

Also see *Extraordinary Event Absence Policy*.

Late Homework Policy:

Late homework is not accepted. Each assignment will indicate a due date and due time (the due time is often the beginning of class). Assignments turned in after the due time on the due date will receive a zero. It is imperative that you start your assignments early.

Each student will receive two free late days to be used at any time during the quarter for the homework assignments. Here are the rules:

- A late day is considered to be 24 hours. If an assignment is handed in within 24 hours of the due date and time, it will be considered one day late. If an assignment is handed in between 24 hours and 48 hours after the due date and time, it will be considered two days late.
- No homework will be accepted after 48 hours of the due date.
- The 24 hour and 48 hour time limits hold even if these days fall on a weekend or holiday. In other words, there is no difference between a weekday, weekend day, or holiday.
- Once the late days are used up, homework must be submitted on time or you will get a zero. There is no option to receive a late penalty once late days are used up. Examples:
 - If you used both late days on HW1, then all five remaining assignments must be submitted on time. If a later assignment was submitted late, that assignment will receive a zero.
 - If you used one late day on HW1, then you have one late day remaining for the other five assignments. If a later assignment was submitted two days late, that assignment will receive a zero.
- The third and fifth homework assignments are due two days before a midterm exam. While it is still possible to use two late days on these assignments such that it will be due at the same time as the exam, it is highly recommended that students complete this assignment before the exam. No adjustments will be made to the exam or the late homework policy for this situation.
- You cannot retroactively go back to an earlier assignment that was handed in late and request a zero on that assignment to get late days back.
- An assignment is only graded once. See the *Programming Assignment Submission Policy* and *Written Homework Submission Policy* for how multiple submissions will be handled.

- Assignments that receive a zero because they are too late will not be graded (I will not look at them).
- It is the student's responsibility to understand this late homework policy and adhere to the submission policies in the syllabus.

The free late days are to accommodate illnesses (including COVID) and other issues that arise. Once the late days are used up, it is the student's responsibility to start and finish remaining assignments early just in case another issue arises.

If there is an extraordinary event where the two late days are not sufficient, please consult the *Extraordinary Event Absence Policy*.

If you have medical and/or mental health issues that may impact your ability to complete assignments, you need to set up arrangements through Disabilities Services. Please see the *Accessibility Policy* for more details.

Exam Policy:

You must be present and take the two midterm exams and final exam in-person at the announced days / times. Failure to appear for an exam will result in a score of zero for that exam.

If you are sick for the exam, you must contact the instructor *before* the exam to make alternative arrangements. The alternative exam must be taken at most two days later and must be taken in person.

- Failure to contact the instructor before the exam will result in a zero. Being too sick to contact the instructor is not considered a valid excuse.
- A student can only have an alternative exam one time during the quarter.
 - If it is necessary for a student to have an alternative exam a second time during the quarter, a 7 point deduction will be applied to the second exam.
 - If a student has had alternative exams for both midterms exams, they will not receive an alternative exam for the final exam. If the student in this situation is unable to make the final exam, they will receive a zero for the final exam.

Alternative exams are only given for sickness and extraordinary events (see *Extraordinary Event Absence Policy*). Other cases will be considered on a case-by-case basis if a student makes a request at least two weeks before the exam. Alternative exams will *not* be given due to work conflicts or students wanting to take the final exam earlier to finish up the quarter earlier.

If you have medical and/or mental health issues that may impact your ability to complete exams, you need to set up arrangements through Disabilities Services. Please see the *Accessibility Policy* for more details.

Extraordinary Event Absence Policy:

If an extraordinary event occurs (such as being hospitalized or the death of a family member), please note the following:

- You need to let me know as soon as possible and must keep in contact with me during the absence. If this is not possible, you will unfortunately have to withdraw from the course.
- It is your responsibility to make up the missing material and catch-up with the remainder of the class as soon as possible.
- If an absence causes you to miss several class periods and assignments that make it very difficult for you to catch-up, you will unfortunately have to withdraw from the course.
- Proof of the extraordinary event may be required. If you are unable or uncomfortable in providing proof, accommodations such as extended deadlines or makeup exams will not be provided.
- In accordance with university policy, incomplete grades (I) are only given if an unexpected absence occurs at the end of the quarter.

The following situations are not considered to be extraordinary events. This is not considered to be an exhaustive list.

- Normal sickness (including COVID) that does not require hospitalization. Students in this situation must adhere to the *Late Homework Policy* and *Exam Policy* earlier in this document.
- Known medical and/or mental health issues. Students must set up arrangements through Disabilities Services. Please see the *Accessibility Policy* for more details.
- Conflicts and deadlines due to work or other classes
- Family-related issues (unless they involve hospitalization or death of a family member)
- Travel-related issues

Accessibility Policy:

Seattle University values diverse types of learners and is committed to ensuring that each student is afforded an equal opportunity to participate in learning experiences. Disability Services (DS) works with students to provide reasonable accommodations to support their learning experiences. This includes students with a learning disability, a chronic health problem, or a mental health condition. This could include any long-term effects of COVID, even after recovery (“long-COVID”), if a health care provider determines it is a chronic health problem.

If you have, or suspect you may have, a condition that may interfere with your performance as a student in this course and have not yet been assessed by DS, please contact DS staff at DS@seattleu.edu or (206) 296-5740. Accommodations to course expectations can be made only through this process and must be approved by DS before implemented in a course. I am committed to working with you, so please consider meeting with me to discuss the logistics of implementing any accommodations approved by DS.

Religious Accommodations Policy:

It is the policy of Seattle University to reasonably accommodate students who, due to the observance of religious holidays, expect to be absent or endure a significant hardship during the course. Requests must be given within the first 14 days of the quarter. For more information, please see [Policy on Religious Accommodations for Students](#).

Programming Assignment Submission Policy:

Programming assignments (assembly language) will be submitted electronically via Canvas.

- Assignments must be submitted via Canvas. Assignments submitted via other means will be rejected without notification.
- While a solution can be submitted multiple times, only the last submission will be graded.
 - If the last submission is after the deadline, it will be considered late and late day(s) will be used. If there are insufficient late days or the submission was submitted over two days late, that submission will be ignored.
- Be sure to test your solutions as assignments will only be graded once after the due date.

Written Homework Submission Policy:

Written homework submissions must meet the following standards or points will be deducted from your assignment:

- Written homework submissions must either be completed using word processing software and/or handwritten in a manner that is neat and legible.
- The answers must appear in numerical order.
- In order to receive partial credit, you must show your work.
 - Certain problems will require you to show your work. For these problems, correct answers without any work will be penalized.
- Your submission should only show a single final solution for each problem. Do not include failed attempts or solutions that have a lot of things crossed out. It is recommended to sketch your solutions on scratch paper initially and then write a final draft of your solution.
- For handwritten submissions, you may not hand in the assignment handout – I have had too many instances in the past where students tried to cram answers on the assignment handout.

Unless specified otherwise, you may submit written homework using one of these two methods:

- (PREFERRED) Hand it directly to the instructor in person either in class or in my office.
 - If I am not in my office, slip it under my office door and immediately send me an email indicating that you slipped it under my door. The date/time of the email will be considered the submitted date/time. If an email is not sent, the submitted date/time will be when I next enter the office.
 - If an assignment is due at the beginning of class, the assignment must be under my door before I leave my office to teach class (assume it is due 10 minutes earlier).
- Submit an electronic copy of the assignment via Canvas (see rules below).

Note that email submissions are not accepted and will be rejected without notification.

In order to submit an electronic copy of written homework using Canvas, you must adhere to the following rules:

- Canvas is set up to only allow files in Microsoft Word (.docx) or PDF format to be submitted. Other formats are not permitted. These include, but are not limited to, the following formats: HTML, JPEG, text, zip.
- Your name must appear in the (word or PDF) document you are attaching.
- Do not include comments in the Canvas submission as they will be ignored. Any clarifying remarks should be contained within the homework document.
- The entire solution must be contained within a single file. Do not send separate documents for each problem.
- If you are scanning images or taking pictures of handwritten homework, make sure the homework is legible and there are no issues due to inadequate settings or poor lighting. The image(s) must be pasted into a single Word or PDF document.
- You are responsible for making sure the file is not corrupted or contains any other issues that would make the file unreadable on my computer. Examples include non-standard fonts, embedded objects, internationalization settings, etc.
- You are responsible for making sure the submitted file is properly submitted via Canvas. The instructor will not respond to requests indicating whether the assignment was properly received.

Students that fail to adhere to the rules above are subject to grade deductions and will lose their ability to submit assignments electronically.

Written assignments are graded only once. If multiple submissions are submitted, the student must clearly specify which submission they want graded within 48 hours of the original due date. If this is not done, the submission that will be graded will be determined as follows:

- If there are multiple written submissions, the last submission will be graded. If I'm unable to tell which submission is last, I will choose one randomly.
- If there are multiple Canvas submissions, the last submission will be graded.
- If there are both written submission(s) and Canvas submission(s), the last written submission will be graded.
- If the last submission is after the deadline, it will be considered late and late day(s) will be used. If there are insufficient late days or the submission was submitted over two days late, that submission will be ignored.

Canceled Class Policy:

If a class is canceled (likely due to inclement weather or instructor illness), the instructor has the right to make up lost class content in an online format.

Lecture Recording Policy:

Lectures are copyright of the instructor. As a student enrolled in the course, you have permission to record audio of the lectures for your personal use only, provided it is not obtrusive to the instructor and/or other students in the class. Recordings may not be publicly disseminated (such as posting on the Internet). For lectures not taught by the instructor, permission to record audio must be explicitly obtained by the guest lecturer.

Videotaping of lectures in any form is prohibited.

Academic Integrity Policy:

Students, unless specifically stated otherwise, are required to do all work in this course individually. Submitted work must be original work done by the student. However, you may use class material without citation. Class material includes information (including examples and code) that was presented in class, discussed during office hours, that appears in the textbook or lecture notes, or was provided by me (or any guest instructor). The use of external sources such as other books, open source, or the Internet must be approved by the instructor and must be cited before submitting the assignment. The use of AI tools (such as ChatGPT) are not permitted in the course.

If you are in doubt whether a particular activity may be considered cheating, ask the instructor.

Any evidence of plagiarism, collaboration, or other cheating will result in a zero for all parties concerned for the assignment or exam in question. In addition, all academic integrity violations will be reported according to the Seattle University Academic Integrity Policy. That process may enforce additional penalties and/or disciplinary action. For further information, please consult the university [Academic Integrity Policy](#).

Low Grade Policy:

Students will be able to monitor their grades via Canvas and you will also receive early feedback around the fourth week of the quarter. If you need guidance on how to improve your academic performance, contact the instructor. The instructor may submit an early alert for students with low grades. Students in this situation may be contacted by a student support staff and/or an advisor.

Grading Dispute Policy:

If you feel something was graded incorrectly or a math error occurred when tabulating the total score of an exam or assignment, please contact me. Grading disputes will only be accepted for one week that starts when the exam or assignment grade was first available to the class.

For a dispute regarding the final grade, please consult the [Academic Grading Grievance Policy](#).