

San José State University
Department of Computer
Science CS 47, Section 04

Introduction to Computer Systems
Spring 2025

Instructor:

Seshadri Paravastu
Department of Computer Science
San Jose State University

Class Time:

TuTh 1:30PM - 2:45PM
First day of class: Jan 23, 2025
Last day of class: May 8, 2025
Final: Tuesday, May 20 1:00-3:00 PM
Classroom: Boccardo Business Center 125
Office Hours: Appointment required via email seshadri.paravastu@sjsu.edu

All e-mail communication to the instructor must have the subject line starting with
[CS47-04]

Course Format

This is an in-person seminar class, and this course encourages healthy class participation with participation counting towards the final grade. This course emphasizes active student participation to mirror the collaborative nature of the tech industry. To foster engagement, spontaneous pop-quizzes may be given periodically. Students will need computers with internet access to access course materials, which will be posted on Canvas prior to each class. Reviewing the chapter before class is strongly recommended. All assignments must be submitted through Canvas and will be graded rigorously. Detailed documentation is essential for achieving top scores. Additionally,

students will work in groups to deliver presentations on pre-assigned topics. A tool 'MARS' will be used to study assembly programming concept.

Course Description

Instruction sets, assembly language and assemblers, linkers and loaders, data representation and manipulation, interrupts, pointers, function calls, argument passing, and basic gate-level digital logic design.

Course Topics:

Computer Organization, Number representation, Programming a Computer, Compilation, Assemblers, Linker, Loader, MIPS assembly language programming, Run-Time Memory Stack, Interrupt & Exceptions, Boolean Algebra, Integer Mathematics, Logic Gates & Logic Design.

Course Objectives:

- To get introduced to the organization of a computer system
- To get familiarized with instruction sets and assembly programming and how it works in the hardware of the system
- To experience programming practice that reinforces binary data representation, assembly instructions, addressing modes, and run-time stack organization
- To get extensive lab practice using computer simulation
- To research and present on current technical developments in the field of powerful computing systems
- To understand the role of a system design engineer and software engineer

Learning Outcomes and Course Goals

Course Goal:

The course consists of an introduction to computer hardware organization and the hardware/software interface. Programming assignments are used to reinforce concepts of data representation, addressing modes, memory organization, run time stacks, and interfacing with high-level languages.

Course Learning Outcomes (CLO):

Upon successful completion of this course, students should be able to:

- To be familiar with the architectural components of a computer system: CPU (registers, ALU), memory, buses
- To be able to convert between decimal, binary, and hexadecimal notations.
- To work with two's complement integers, floating-point numbers, and character encodings
- To be able to write assembly programs that use load/store, arithmetic, logic, branches, call/return and push/pop instructions.
- To understand the gate-level operations of basic ALU

Required Texts/Readings

COMPUTER ORGANIZATION and DESIGN | Edition: 5
Author: DAVID A. PATTERSON, ISBN:9780124077263
Publication Date:10/10/2013 Publisher: ELSEVIER

Other Readings

Logic & Computer Design Fundamentals 5th Edition ISBN 9780133760637
Author(s): M. Morris R. Mano; Charles R. Kime; Tom Martin Publisher: PEARSON

Classroom Protocol

Lucas College and Graduate School of Business: Program Goals and Class room policy
<http://www.sjsu.edu/cob/Students/policies/index.html>

Eating:

Eating and drinking (except water) are prohibited in the Boccardo Business Center. Students with food will be asked to leave the building. Students who disrupt the course by eating and do not leave the building will be referred to the Judicial Affairs Officer of the University.

Note: Hats will not be worn in the classroom.

Cell Phones:

Students will turn their cell phones off or put them on vibrate mode while in class. They will not answer their phones in class. Students whose phones disrupt the course and do not stop when requested by the instructor will be referred to the Judicial Affairs Officer of the University.

Computer Use:

Students use computers only for class-related activities. These include activities such as taking notes on the lecture underway, following the lecture on Web-based PowerPoint slides that the instructor has posted, and finding Web sites to which the instructor directs students at the time of the lecture. Students who use their computers for other activities or who abuse the equipment in any way, at a minimum, will be asked to leave the class and will lose participation points for the day, and, at a maximum, will be referred to the Judicial Affairs Officer of the University for disrupting the course. (Such referral can lead to suspension from the University.) Students are urged to report to their instructors computer use that they regard as inappropriate (i.e., used for activities that are not class related). No recording devices may be used in the classroom.

Academic integrity statement (from Office of Judicial Affairs):

Your commitment to learning, as evidenced by your enrollment at San José State University and the University's Academic Integrity Policy requires you to be honest in all your academic course work. Faculty members are required to report all infractions to the Office of Judicial Affairs. The policy on academic integrity is at <http://www2.sjsu.edu/senate/S04-12.pdf>

Campus policy in compliance with the Americans with Disabilities Act:

If you need course adaptations or accommodations because of a disability, or if you need special arrangements for this online class, please email me as soon as possible and make an appointment to see me. Presidential Directive 97-03 requires that students with disabilities register with AEC to establish a record of their disability.

Proctoring Software and Exams

Exams will be proctored in this course through Respondus Monitor and LockDown Browser. Please note it is the instructor's discretion to determine the method of proctoring. If cheating is suspected the proctored videos may be used for further inspection and may become part of the student's disciplinary record. Note that the proctoring software does not determine whether academic misconduct occurred, but does determine whether something irregular occurred that may require further investigation. Students are encouraged to contact the instructor if unexpected interruptions (from a parent or roommate, for example) occur during an exam.

Recording Zoom Classes

If necessary, portions of this course (i.e., lectures, discussions, student presentations) may be recorded for instructional or educational purposes. The recordings will only be shared with students enrolled in the class through Canvas.

Students are not allowed to record without instructor permission

Students are prohibited from recording class activities (including class lectures, office hours, advising sessions, etc.), distributing class recordings, or posting class recordings. Materials created by the instructor for the course (syllabi, lectures and lecture notes, presentations, etc.) are copyrighted by the instructor. This university policy (S12---7) is in place to protect the privacy of students in the course, as well as to maintain academic integrity through reducing the instances of cheating. Students who record, distribute, or post these materials will be referred to the Student Conduct and Ethical Development office. Unauthorized recording may violate university and state law. It is the responsibility of students that require special accommodations or assistive technology due to a disability to notify the instructor.

Technology Requirements

Students are required to have an electronic device (laptop, desktop or tablet) with a camera and built-in microphone. SJSU has a free equipment loan program available for students. Students are responsible for ensuring that they have access to reliable Wi-Fi during tests.

Zoom Classroom Requirements

- If necessary, zoom dial-in information will be provided.

LockDown Browser + Webcam Requirement

This course requires the use of LockDown Browser and a webcam for online quizzes. The webcam can be the type that's built into your computer or one that plugs in with a USB cable. Watch this brief video to get a basic understanding of LockDown Browser and the webcam

feature. <https://www.respondus.com/products/lockdown-browser/student-movie.shtml>

Download Instructions

Download and install LockDown Browser from this link:

<https://download.respondus.com/lockdown/download.php?id=9679>

[37270](#)

Once Installed

Start LockDown Browser

Log into to Canvas

Navigate to the quiz

Note: You won't be able to access a quiz that requires LockDown Browser with a standard web browser. If this is tried, an error message will indicate that the test requires the use of LockDown Browser. Simply start LockDown Browser and navigate back to the exam to continue.

Guidelines

When taking an online quiz, follow these guidelines:

Ensure you're in a location where you won't be interrupted

Turn off all other devices (e.g. tablets, phones, second computers) and place them outside of your reach.

Take the exam in a well-lit room, but avoid backlighting.

Remember that LockDown Browser will prevent you from accessing other websites or applications; you will be unable to exit the test until all questions are completed and submitted

Grading:

This course follows weighted grading with weights for the course deliverables components, as follows:

<i>Participation/Project/Homework/Discussions</i>	25%
<i>Quizzes (Average of All)</i>	25%
<i>Midterm- I:</i>	15%
<i>Midterm-II:</i>	15%
<i>Final Exam:</i>	20%
Total	100%

Extra Credits: No extra credit or make-up credits

Your overall grade is calculated as a sum of all assessment elements mentioned above. No curve will be added to an individual element. If necessary, I will curve the overall grades.

For this class, overall grades are converted to letter grades as follows:

A+ = 97 – 100	B+ = 87 – 89	C+ = 77 – 79	D+ = 67 – 69	F = below 60
A = 94 – 96	B = 84 – 86	C = 74 – 76	D = 64 – 66	
A- = 90 – 93	B- = 80 – 83	C- = 70 – 73	D- = 60 – 63	

Grade earned in every component above will be calculated as a percentage, and the grade percentage * weight gives you the weighted score for that component. Total of all weighted scores for individual components will give you the weighted score for the course. Your final letter grade will be based on this weighted score.

Attendance for the first 2 classes is mandatory, absence for either will lead to being dropped from the class.

University Policies

Per University Policy S16-9, university-wide policy information relevant to all courses, such as academic integrity, accommodations, etc. will be available on the Office of Graduate and

Undergraduate Programs' [Syllabus Information web page](http://www.sjsu.edu/gup/syllabusinfo/) at <http://www.sjsu.edu/gup/syllabusinfo/>

Course Schedule¹

Date	Lecture	Notes
01/23	<i>Syllabus Overview, Intro, Submit Prerequisite Survey (First Class)</i>	
01/28	Introduction to Computer	Use cases in real world, system programming
01/30	Computer Organization	Architecture and Working, Code Instruction Flow at hardware-level
02/04	Number Representations in Computers	Data Types, Team Formation for Presentations
02/06	Programming a computer	Compilation Flow- Assembler, linker and loader, Code flow in depth
02/11	Assembler, Linker, Loader SPIM IDE & MIPS Simulator	
02/13	Intro to Assembly Programming	How to code in Assembly, syntax, simple programs
02/18	Assembly Programming- deep dive	Announcement of PA-1- How to submit programming assignments Deadline to get Presentation Topic Approved
02/20	MIPS Assembly Language, Arithmetic & Logic Instructions	Quiz 1, in class
02/25	Memory Usage I	
02/27	Memory Usage II	
03/04	Comparison, branch & jump Instruction	
03/06		Quiz 2, in class Presentation- Team 1
03/11	Procedure Call	Presentation- Team 2
03/13	Example 'printf' procedure call	Presentation- Team 3
03/18	Review Session	
03/20	Midterm I Exam (in class)	
03/25	Boolean Algebra I	Presentation- Team 4
03/27	Boolean Algebra II	Presentation- Team 5
04/08	Logic gates	Presentation- Team 6

04/10		Quiz 3, in class, Presentation- Team 7
04/15	Addition / Subtraction Logic	Presentation Team 8
04/17	Multiplication Logic	Presentation - Team 9
04/22	Division Logic, Floating Point Number Representation	Presentation - Team 10
04/24	Midterm II Exam (in class)	
04/29		Presentation - Team 11
05/01	Exceptions & Interrupts	Presentation - Team 12
05/06	Review	Project Presentation Report Due
05/08	Project Presentations	Last Day of Instruction
05/20	Final Exam	Tuesday, May 20 1:00-3:00 PM

1– subject to change by instructor without prior notice.