

**San José State University**  
**Department of Computer Science**  
**CS 47, Section 80**  
**Introduction to Computer Systems**  
**Fall 2023**

**Course and Contact Information**

<b><i>Instructor:</i></b>	Kaushik Patra
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<b><i>Office Hours:</i></b>	TTh 7:15 pm – 8:30 pm
<b><i>Class Days/Time:</i></b>	TTh 6:00 pm – 7:15 pm
<b><i>Classroom:</i></b>	Online
<b><i>Prerequisites:</i></b>	CS/MATH 42/42X and CS 46B/CS49J or equivalent (with a grade of "C-" or better)

**Course Format**

This course uses online flipped method with designated meeting time as above mentioned. In general students are expected to have computer systems with internet connection and webcam. A tool ‘MARS’ will be used to study assembly programming concept. The materials and lecture videos are uploaded in Canvas prior to class. Students are required to review the lecture video and note before coming to class. During class hour it is expected that students have access to their laptop with internet connection to download some program material to work on during class hour if needed. All the homework and assignments are to be uploaded in Canvas.

## **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, 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
- To experience extensive 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 appreciate how the computer hardware supports systems programming and high-level languages

## **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

### ***BS in Computer Science Program Outcomes Supported:***

These are the BSCS Program Outcomes supported by this course:

- a) An ability to apply knowledge of computing and mathematics to solve problems.
- b) An ability to analyze a problem, to identify and define the computing requirements appropriate to its solution
- c) An ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs
- i) An ability to use current techniques, skills, and tools necessary for computing practice.
- j) An ability to apply mathematical foundations, algorithmic principles, and computer science theory in the modeling and design of computer-based systems in a way that demonstrates comprehension of the tradeoffs involved in design choices.

## Required Texts/Readings

### Textbook

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  
Author: MANO & KIME  
ISBN: 9780131989269  
Publication Date: 06/15/2007  
Publisher: PEARSON

### Other technology requirements / equipment / material

You will be **required** to bring a [wireless laptop](#) to all classes.

## Course Requirements and Assignments

- Each student is expected to be present, punctual, and prepared at every scheduled class and lab session. It is assumed that the students already have basic knowledge of digital Boolean logic and fundamentals of assembly language machine programming.
- Attendance is not optional. Individual participation is also required. There will be no make-ups for missed midterm or assignments, unless any special arrangements are made with the instructor beforehand.
- All student **must complete** the *Syllabus agreement* through by **Aug 25, 2023 11:59 pm**. Any one **failed** to do so will be **dropped** from the class. This agreement will be sent to individual email as '**[CS47,80] PreReq-Survey**' from <https://sjsu.qualtrics.com>.
- There will be **8 programming assignments, 6 quizzes, 1 individual project, one midterm and final exam**. All programming assignments and projects should be submitted through Canvas. **No scanned copy** of handwritten solution is allowed. Allowed document type is **PDF** only for written reports.

Project report should contain the following.

- Introduction containing objective.
- Requirement.
- Design and Implementation.
- Testing
- Conclusion
- Make sure to
  1. Include clear diagrams for requirement and design.
  2. Include code snippet to explain implementation.
  3. Include screen shots of testing results.
  4. Upload source code and test program as zip archive.

Project reports are encouraged to be submitted in [IEEE format](#).

[[http://www.ieee.org/conferences\\_events/conferences/publishing/templates.html](http://www.ieee.org/conferences_events/conferences/publishing/templates.html) ]

**10% of the obtained marks in project will be awarded as extra points in project evaluation if report submitted in proper IEEE format.**

## **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=967937270>

### **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
- Before starting the test, know how much time is available for it, and also that you've allotted sufficient time to complete it
- Clear your desk or workspace of all external materials not permitted - books, papers, other devices
- Remain at your computer for the duration of the test

- If the computer, Wi-Fi, or location is different than what was used previously with the "Webcam Check" and "System & Network Check" in LockDown Browser, run the checks again prior to the exam
- To produce a good webcam video, do the following:
  - Avoid wearing baseball caps or hats with brims
  - Ensure your computer or device is on a firm surface (a desk or table). Do NOT have the computer on your lap, a bed, or other surface where the device (or you) are likely to move
  - If using a built-in webcam, avoid readjusting the tilt of the screen after the webcam setup is complete
  - Take the exam in a well-lit room, but avoid backlighting (such as sitting with your back to a window)
- 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

## Getting Help

### Several resources are available if you encounter problems with LockDown Browser:

- The Windows and Mac versions of LockDown Browser have a "Help Center" button located on the toolbar. Use the "System & Network Check" to troubleshoot issues. If an exam requires you to use a webcam, also run the "Webcam Check" from this area
- Respondus has a Knowledge Base available from [support.respondus.com](https://support.respondus.com). Select the "Knowledge Base" link and then select "Respondus LockDown Browser" as the product. If your problem is with a webcam, select "Respondus Monitor" as your product
- If you're still unable to resolve a technical issue with LockDown Browser, go to [support.respondus.com](https://support.respondus.com) and select "Submit a Ticket". Provide detailed information about your problem and what steps you took to resolve it

## Final Examination or Evaluation

There shall be an appropriate final examination and evaluation at the scheduled time as indicated in University calendar, unless specifically exempted by the college dean who has curricular responsibility of the course. The examination is expected to have descriptive, problem analysis and problem-solving style questions to answer.

## Grading Information

1. Programming assignment carries **20%** towards final score. Average of 8 scores from programming assignments will be contributed.
2. Quizzes carried **30%** towards final score. Average of 6 scores from quizzes will be contributed.
3. Project carries **20%** towards final score.
4. Midterm carries **10%** towards final score.
5. Final carries **20%** towards final score.

Submission is allowed till 11:59 pm on due date. Zero delay tolerance for the submission, i.e. NO late submission is permitted, unless you make special arrangements with your instructor beforehand.

You will receive a numeric score for the midterm, the final, each of the total homework, and each project submission. Letter grade, which is your class grade, will be obtained by adding the numeric scores and weighing with the percentages given below. Fraction in percentage will be converted into nearest integer value ('>= 0.5' will be moved to next integer number, '< 0.5' will be moved to previous integer number).

A+ = 100-97%	A = 96-93%	A- = 92-90%
B+ = 89-87%	B = 86-83%	B- = 82-80%
C+ = 79-77%	C = 76-73%	C- = 72-70%
D+ = 69-67%	D = 66-63%	D- = 62-60%
F = 59-0% Failure		

## Classroom Protocol

1. **You must join online video meeting on time!** There will be a waiting room online – join 5 minutes early. Students are encouraged to keep their video on – however, if bandwidth, other technical and/or any other type of reservation is a concern, make sure to have your real photo clearly showing your face as profile picture. Without proper profile picture, students will not be allowed in online meeting. Students must have a profile matching their names and SJSU email.
2. **All class session will be recorded and stored for future reference.** Please send instructor an email if you have any concern about this. By default, students are assumed to give consent for this recording and they are aware that they may appear in the audio/video recording.
3. **Class session may be streamed as YouTube live session which will have public access.** Please send instructor an email if you have any concern about this. By default, students are assumed to give consent for this live streaming, and they are aware that they may appear in the live streaming.
4. **Attend Zoom sessions (especially with video on) with Business Casual attire.**
5. **Students are not allowed to make audio / video recording or photography in class session without prior permission of instructor.**
6. **Course material developed by the instructor is the intellectual property of the instructor and cannot be shared publicly without his/her approval. You may not publicly share or upload instructor generated material for this course such as exam questions, lecture notes, or homework solutions without instructor consent.**
7. Please keep your microphone mute during class unless you are participating in discussion.
8. If you miss a lecture, you are still responsible for any material discussed or assignments given. A large portion of each class will be used for hands-on lab / discussion. All students are expected to participate in class activities. Students who are often absent will find themselves at a disadvantage during the tests.
9. It is individual student responsibility to check validity of their homework, assignment, project, submission (format error, blank files, corrupted files, and many more such) and re-submit within deadline if needed. Once the grading is started there will be no consideration for resubmit. *If the submission found to have any logistics issue at grading time (format error, blank files, corrupted files, and many more such) it will be evaluated as 0.*

10. Any student that needs accommodations or assistive technology due to a disability should work with the *Accessible Education Center (AEC)*, and the instructor.
11. **Note that all federal, state, CSU system, and campus regulations on conduct including harassment and discrimination against other students or faculty apply to the online environment, just as in face-to-face instruction.**
12. All e-mail communication to the instructor must have the subject line start with [CS47,80]
13. Email to be sent to the instructor's SJSU email ID ([kaushik.patra@sjsu.edu](mailto:kaushik.patra@sjsu.edu)) only.

### **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 Office of Graduate and Undergraduate Programs' [Syllabus Information web page](#) at <http://www.sjsu.edu/gup/syllabusinfo/>

### **COVID-19 and Monkeypox**

Students registered for a College of Science (CoS) class with an in-person component should view the [CoS COVID-19 and Monkeypox Training](#) slides for updated CoS, SJSU, county, state and federal information and guidelines, and more information can be found on the [SJSU Health Advisories](#) website. By working together to follow these safety practices, we can keep our college safer. Failure to follow safety practice(s) outlined in the training, the SJSU Health Advisories website, or instructions from instructors, TAs or CoS Safety Staff may result in dismissal from CoS buildings, facilities or field sites. Updates will be implemented as changes occur (and posted to the same links).

**Course Schedule** – *subject to change by instructor with due notice.*

<b>Date</b>	<b>Lecture</b>	<b>Notes</b>
08/22/23		Green Sheet Review
08/24/23	Introduction to Computer	<b>Submit Prerequisite Survey &amp; Syllabus Agreement (Aug 25)</b>
08/29/23	Computer Organization	
08/31/23	Number Representation	
09/05/23	Programming a computer	
09/07/23	Assembler / Linker /Loader	
09/12/23	SPIM simulator	<b>Quiz-01 (Sep 08-09)</b>
09/14/23	Memory Usage I	<b>Programming assignment 1 Submission</b>
09/19/23	Memory Usage II	<b>Programming assignment 2 Submission</b>
09/21/23	Memory Usage III	<b>Programming assignment 3 Submission</b>
09/26/23	MIPS Assembly Language, Arithmetic & Logic Instructions	<b>Programming assignment 4 Submission Quiz-02 (Sep 22-23)</b>
09/28/23	Comparison, branch & jump Instruction	
10/03/23	Procedure Call	<b>Programming assignment 5 Submission</b>
10/05/23	Example 'printf' procedure call	<b>Quiz-03 (Oct 06-07)</b>
10/10/23	Midterm Review I	<b>Programming assignment 6 Submission</b>
10/12/23	Midterm Review II	<b>Programming assignment 7 Submission</b>
10/17/23	<b>Midterm Exam (during your class meeting time)</b>	
10/19/23	Boolean Algebra I	
10/24/23	Boolean Algebra II	<b>Programming assignment 8 Submission,</b>
10/26/23	Logic gates	<b>Quiz-04 (Oct 27-28)</b>
10/31/23	Logic Circuit Design	
11/02/23	Logic Design Components	
11/07/23	Addition / Subtraction Logic	
11/09/23	Multiplication Logic	<b>Quiz-05 (Nov 10-11)</b>
11/14/23	Division Logic	
11/16/23	Floating Point Number Representation	
11/21/23	Exceptions & Interrupts	
11/23/23	<b>Non Instructional Day</b>	
11/28/23	Review I	<b>Project Submission</b>
11/30/23	Review II	<b>Quiz-06 (Dec 01-02)</b>
12/05/23	Review III	
12/12/23	<b>Final Exam 5:15 pm – 7:30 pm</b>	