San José State University
Department of Computer Science
CS47, Section 01

Introduction to Computer Systems,

Spring 2017

Course and Contact Information

Instructor:	Vidya Rangasayee
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Office Hours:	T/Th 12:30-1:20 PM. Additional hours by appointment only
Class Days/Time:	T/Th 1:30 - 2:45 PM
Classroom:	Duncan Hall (DH) 250
Prerequisites:	CS 46B or equivalent (with a grade of C- or better
GE/SJSU Studies Category:	

Course Format : Technology Intensive, hybrid.

Faculty Web Page and MYSJSU Messaging: We will use Canvas for all class related materials. Discussions will be facilitated via Piazza. Any general questions must be posted on Piazza for benefit of others. Any specific/personal questions (grade related or personal situations) must be communicated via email.

Catalog 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

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
d. An ability to use current techniques, skills, and tools necessary for computing practice

e. 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 The Hardware/Software Interface | Edition: 5
Author: DAVID A. PATTERSON, JOHN. L. HENNESSY
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

Students must have a wireless laptop with a C compiler. This must be brought to every class.

Course Requirements and Assignments

SJSU classes are designed such that in order to be successful, it is expected that students will spend a minimum of forty-five hours for each unit of credit (normally three hours per unit per week), including preparing for class, participating in course activities, completing assignments, and so on. More details about student workload can be found in University Policy S12-3 at http://www.sjsu.edu/senate/docs/S12-3.pdf.

- 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.
- You will be **required** to bring a wireless laptop to all classes.
- Attendance is **NOT** optional. Individual participation is also required. There will be no make-ups for missed midterm or assignments, unless any special arrangements is made with the instructor beforehand.
- There will be 4-5 **homework** and **1 individual projects,** one **midterm** and **final exam**. All home works and projects should be submitted through Canvas. **No scanned copy** of handwritten solution is allowed. Allowed document types are PDF/DOC.

Final Examination or Evaluation

There is a written Final Exam for this course. Please check the university Final Exam schedule for the exact date and time of the final exam (http://info.sjsu.edu/static/catalog/final-exam-schedule-spring.html).

Grading Information (Required)

1. Homework carries **20%** towards final score. Average of 2 score from homework will be contributed.

2. Project carries **30%** towards final score.
3. Midterm carries **20%** towards final score.
4. Final carries **30%** towards final score.

Submission is allowed till 11:59 pm on due date. You will lose 20% of the score for every day that your submission is LATE.
I first try scores of 90, 80, and 70 to cut off letter grades of A-, B-, and C-, respectively. If overall class performance is too low to use these cut offs, I set a cut off of C- to a lower score than the class total average but a higher score than 60 (this number may change), and divide the students' group above the cut off of C- into A+, A, A-, B+, B, B-, C+, C, C-. The rest of students will be given by a grade of D+, D, D-, F or WU depending on their class performance.

Note that "All students have the right, within a reasonable time, to know their academic scores, to review their grade-dependent work, and to be provided with explanations for the determination of their course grades." See University Policy F13-1 at http://www.sjsu.edu/senate/docs/F13-1.pdf for more details.

Classroom Protocol

1. **You must come to class on time!** Students entering the classroom late disrupt the lecture and / or the students already in class who may be engaged in lab or discussion. Late students will not be accepted in class.
2. 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.
3. No audio / video recording or photography in the classroom without prior permission of instructor.
4. No personal discussion or cell phone activity during class time. Please set the cell phone on **silent/vibrate** mode.
5. All e-mail communication to the instructor must have the subject line start with **[CS-47, 01]**
6. Email to be sent to the instructor's SJSU email ID (vidya.rangasayee@sjsu.edu) only.
7. Start on your homework early and stay on top of them. Some assignments take way more time than you expect.
8. Have fun learning.

University Policies (Required)

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/"

CS 47 Intro to Comp Systems, Spring 2017, Course Schedule

List the agenda for the semester including when and where the final exam will be held. Indicate the schedule is subject to change with fair notice and how the notice will be made available.

Week	Date	Topics, Readings, Assignments, Deadlines	Additional Notes
1	1/26/2017	Intro to CS47	
2	1/31/2017	Introduction to Computers	HW01 Assigned
2	2/2/2017	Computer Organization	
3	2/7/2017	Number Representation	
3	2/9/2017	Programming a computer	
4	2/14/2017	Assembler	HW02 Assigned
4	2/16/2017	Linker/Loader	HW01 Due
5	2/21/2017	SPIM simulator	
5	2/23/2017	Memory Usage	
6	2/28/2017	MIPS Assembly Language	HW03 Assigned
6	3/2/2017	Arithmetic Instructions	HW02 Due
7	3/7/2017	Logic instructions	
7	3/9/2017	Comparison Instructions	
8	3/14/2017	Branch and Jump	
8	3/16/2017	Procedure Call	HW03 Due
9	3/21/2017	Midterm Review	Project Assigned
9	3/23/2017	**Midterm**	
10	3/28/2017	SPRING RECESS - NO CLASS	
10	3/30/2017	SPRING RECESS - NO CLASS	

Week	Date	Topics, Readings, Assignments, Deadlines	Additional Notes
11	4/4/2017	Exceptions and Interrupts	HW04 Assigned
11	4/6/2017	Boolean Algebra I	
12	4/11/2017	Boolean Algebra II	
12	4/13/2017	Addition Logic	
13	4/18/2017	Subtraction Logic	HW05 Assigned
13	4/20/2017	Multiplication Logic	HW04 Due
14	4/25/2017	Division Logic	
14	4/27/2017	Logic Gates I	
15	5/2/2017	Logic Gates II	Project Checkpoint
15	5/4/2017	Logic Design	HW05 Due
16	5/9/2017	TBD	
16	5/11/2017	TBD	
17	5/16/2017	Review	Projects Due
Final Exam	5/23/2017	DH 250 12:15-14:30	