San José State University

Computer Science Department

CS 47, Section 01

Introduction to Computer System

Fall, 2017

Course and Contact Information

Instructor:	Kaushik Patra
Office Location:	DH 282
Telephone:	(408) 924-5161
Email:	kaushik.patra@sjsu.edu
Office Hours:	Mon/Wed 4:30 pm – 5:45 pm
Class Days/Time:	MW 6:00 pm – 7:15 pm (Sec01)
Classroom:	DH 135
Prerequisites:	CS 46B or CS49J or equivalent (with a grade of "C-" or better)

Course Format

This course uses hybrid style. In general students are expected to have computer systems with internet connection. A tool 'MARS' will be used to study assembly programing concept. The materials are uploaded in Canvas prior to class. Students are encouraged to review the lecture note before coming to class. During class hour it is expected that students bring 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 practicej

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 is made with the instructor beforehand.
- All student **must complete** the ***Syllabus agreement*** through by ***Aug 25, 2017 11:59 pm***. Any one **failed** to do so will be **dropped** from the class. This agreement will be sent to individual email as '***[CS47,01] PreReq-Survey***' from https://sjsu.qualtrics.com.
- There will be **2 home works, 8 programming assignments** and **1 individual project,** one **midterm** and **final exam**. All home works, programming assignments and projects should be submitted through Canvas. **No scanned copy** of handwritten solution is allowed. Allowed document type is **PDF** only.

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]

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

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

5. No personal discussion or cell phone activity during class time. Please set the cell phone on **silent/vibrate** mode.

6. All e-mail communication to the instructor must have the subject line start with **[CS47,01]**

7. Email to be sent to the instructor's SJSU email ID (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/

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

Date	Lecture	Notes
08/23/16	Green Sheet Review	
08/28/16	Introduction to Computer	HW01 is published
08/30/16	Computer Organization	
09/04/16	**Labor Day – Campus Closed**	
09/06/16	Number Representation	Last day to drop course
09/11/16	Programming a computer	Add code will be supplied through e-mail
09/13/16	Assembler / Linker /Loader	Last day to add course
09/18/16	SPIM simulator	
09/20/16	Memory Usage I	**Programming assignment 1 Submission**
09/25/16	Memory Usage II	**Programming assignment 2 Submission**
09/27/16	Memory Usage III	**Programming assignment 3 Submission**
10/02/16	MIPS Assembly Language, Arithmetic & Logic Instructions	**Programming assignment 4 Submission**
10/04/16	Comparison, branch & jump Instruction	
10/09/16	Procedure Call	**Programming assignment 5 Submission**
10/11/16	Example 'printf' procedure call	**Programming assignment 6 Submission (10/14)**
10/16/16	Midterm Review I	**HW01 Submission**
10/18/16	Midterm Review II	Programming assignment 7 Submission, HW02 is published
10/23/16	**Midterm Exam (during your class meeting time)**	
10/25/16	Boolean Algebra I	Project is published; Programming assignment 8 Submission
10/30/16	Boolean Algebra II	
11/01/16	Logic gates	
11/06/16	Logic Circuit Design	
11/08/16	Logic Design Components	
11/13/16	Addition / Subtraction Logic	
11/15/16	Multiplication Logic	
11/20/16	Division Logic	
11/22/16	**Thanksgiving – Non-instructional Day**	
11/27/16	Floating Point Number Representation	**HW02 Submission**
11/29/16	Exceptions & Interrupts	
12/04/16	Review I	**Project Submission**
12/06/16	Review II	
12/11/16	Review III	
12/13/16	**Final Exam 5:15 pm – 7:30 pm**	