San José State University

Computer Science Department

CS 47, Section 01

Introduction to Computer System

Fall, 2015

Course and Contact Information

Instructor:	Kaushik Patra
Office Location:	DH 282
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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
Classroom:	DH135
Prerequisites:	CS 46B or equivalent (with a grade of "C-" or better)

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

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.

Recommended Texts/Readings – can be rented or bought used/new from SJSU bookstore

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

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.

- 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.

- All student **must complete** the ***Syllabus agreement*** through Canvas quiz by ***Aug 26, 2014 11:59 pm***. Any one **failed** to do so will be **dropped** from the class.

- There will be **2 home works** 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 / ODT / DOC.

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 will be awarded as extra points in project evaluation if report submitted in proper IEEE format.

Grading Policy

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**. 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		

"Students are strongly encouraged to take courses to satisfy GE Areas R, S, and V from departments other than their major department. Passage of the Writing Skills Test (WST) or ENGL/LLD 100A with a C or better (C- not accepted), and completion of Core General Education are prerequisite to all SJSU Studies courses. Completion of, or co--registration in, 100W is strongly recommended. A minimum aggregate GPA of 2.0 in GE Areas R, S, & V shall be required of all students." See University Policy S14-5 at http://www.sjsu.edu/senate/docs/S14-5.pdf."

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 (kaushik.patra@sjsu.edu) only.

University Policies

Dropping and Adding:

Students are responsible for understanding the policies and procedures about add/drop, grade forgiveness, etc. Refer to the current semester's Catalog Policies section at http://info.sjsu.edu/static/catalog/policies.html. Add/drop deadlines can be found on the current academic year calendars document on the Academic Calendars webpage at http://www.sjsu.edu/provost/services/academic_calendars/. The Late Drop Policy is available at http://www.sjsu.edu/aars/policies/latedrops/policy/**.** Students should be aware of the current deadlines and penalties for dropping classes. Information about the latest changes and news is available at the Advising Hub at http://www.sjsu.edu/advising/.

Consent for Recording of Class and Public Sharing of Instructor Material :

University Policy S12-7, http://www.sjsu.edu/senate/docs/S12-7.pdf, requires students to obtain instructor's permission to record the course :

- "Common courtesy and professional behavior dictate that you notify someone when you are recording him/her. You must obtain the instructor's permission to make audio or video recordings in this class.

Such permission allows the recordings to be used for your private, study purposes only. The recordings are the intellectual property of the instructor; you have not been given any rights to reproduce or distribute the material."

- "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."

Academic integrity :

Your commitment, as a student, to learning is evidenced by your enrollment at San Jose State University. The University Academic Integrity Policy S07-2 at http://www.sjsu.edu/senate/docs/S07-2.pdf requires you to be honest in all your academic course work. Faculty members are required to report all infractions to the office of Student Conduct and Ethical Development. The Student Conduct and Ethical Development website is available at http://www.sjsu.edu/studentconduct/.

Campus Policy in Compliance with the American Disabilities Act :

If you need course adaptations or accommodations because of a disability, or if you need to make special arrangements in case the building must be evacuated, please make an appointment with me as soon as possible, or see me during office hours. Presidential Directive 97-03 at http://www.sjsu.edu/president/docs/directives/PD_1997-03.pdf requires that students with disabilities requesting accommodations must register with the Accessible Education Center (AEC) at http://www.sjsu.edu/aec to establish a record of their disability.

Accommodation to Students' Religious Holidays :

San José State University shall provide accommodation on any graded class work or activities for students wishing to observe religious holidays when such observances require students to be absent from class. It is the responsibility of the student to inform the instructor, in writing, about such holidays before the add deadline at the start of each semester. If such holidays occur before the add deadline, the student must notify the instructor, in writing, at least three days before the date that he/she will be absent. It is the responsibility of the instructor to make every reasonable effort to honor the student request without penalty, and of the student to make up the work missed. See University Policy S14-7 at http://www.sjsu.edu/senate/docs/S14-7.pdf.

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

Date	Lecture	Notes
08/24/15	Intro CS47	
08/26/15	Introduction to Computer,	**Submit Prerequisite Survey & Syllabus Agreement**
08/31/15	Computer Organization	
09/02/15	Number Representation	Add code will be supplied through e-mail
09/07/15	**Labor Day – Campus Closed**	
09/09/15	Programming a computer	
09/14/15	Assembler	
09/16/15	Linker / Loader	
09/21/15	SPIM simulator	
09/23/15	Memory Usage	
09/28/15	MIPS Assembly Language	HW01 is published
09/30/15	Arithmetic Instructions	
10/05/15	Logic Instructions	
10/07/15	Comparison Instruction	
10/12/15	Branch & jump Instruction	HW02 is published
10/14/15	Mid-term Review	**HW01 Submission**
10/19/15	**Midterm Exam**	
10/21/15	Procedure Call	Project is published
10/26/15	Exceptions & Interrupts	
10/28/15	Boolean Algebra I	
11/02/15	Boolean Algebra II	
11/04/15	Addition Logic	
11/09/15	Subtraction Logic	
11/11/15	**Veteran's Day – Campus Closed**	
11/16/15	Multiplication Logic	**HW02 Submission**
11/18/15	Division Logic	
11/23/15	Logic Gates I	
11/25/15	Logic Gates II	
11/30/15	Logic Design	**Project Submission**
12/02/15	Review I	
12/07/15	Review II	
12/14/15	**Final Exam @ 5:15 PM – 7:30 PM (DH135)**	