

San José State University
Computer Science Department
CS 47, Section 01/02
Introduction to Computer System
Spring, 2016

Course and Contact Information

<i>Instructor:</i>	Kaushik Patra
<i>Office Location:</i>	DH 282
<i>Telephone:</i>	(408) 924-5161
<i>Email:</i>	kaushik.patra@sjsu.edu
<i>Office Hours:</i>	Tue/Thr 4:30 pm – 5:45 pm
<i>Class Days/Time:</i>	TTh 6:00 pm – 7:15 pm (Sec01)
	TTh 7:30 pm – 8:45 pm (Sec02)
<i>Classroom:</i>	DH 351 (Sec01)
	MH 233 (Sec02)
<i>Prerequisites:</i>	CS 46B or CS49J 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

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
- 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 | 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

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](http://www.sjsu.edu/senate/docs/S12-3.pdf) 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.
- All student **must complete** the *Syllabus agreement* through by **Feb 02, 2016 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-SP16-PreReq-Survey**' in <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](#).

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

NOTE that [University policy F69-24](http://www.sjsu.edu/senate/docs/F69-24.pdf) at <http://www.sjsu.edu/senate/docs/F69-24.pdf> states that “Students should attend all meetings of their classes, not only because they are responsible for material discussed therein, but because active participation is frequently essential to insure maximum benefit for all members of the class. Attendance per se shall not be used as a criterion for grading.”

Grading Policy

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		

“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](http://www.sjsu.edu/senate/docs/S14-5.pdf) at <http://www.sjsu.edu/senate/docs/S14-5.pdf>.”

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](http://www.sjsu.edu/senate/docs/F13-1.pdf) 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. 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] or [CS47,02]** (use the appropriate section that you are in)
7. Email to be sent to the instructor's SJSU email ID (kaushik.patra@sjsu.edu) only.

University Policies

General Expectations, Rights and Responsibilities of the Student

As members of the academic community, students accept both the rights and responsibilities incumbent upon all members of the institution. Students are encouraged to familiarize themselves with SJSU's policies and practices pertaining to the procedures to follow if and when questions or concerns about a class arises. See [University Policy S90–5](http://www.sjsu.edu/senate/docs/S90-5.pdf) at <http://www.sjsu.edu/senate/docs/S90-5.pdf>. More detailed information on a variety of related topics is available in the [SJSU catalog](http://info.sjsu.edu/web-dbgen/narr/catalog/rec-12234.12506.html), at <http://info.sjsu.edu/web-dbgen/narr/catalog/rec-12234.12506.html>. In general, it is recommended that students begin by seeking clarification or discussing concerns with their instructor. If such conversation is not possible, or if it does not serve to address the issue, it is recommended that the student contact the Department Chair as a next step.

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](http://info.sjsu.edu/static/catalog/policies.html) 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](http://www.sjsu.edu/provost/services/academic_calendars/) at http://www.sjsu.edu/provost/services/academic_calendars/. The [Late Drop Policy](http://www.sjsu.edu/aars/policies/latedrops/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](http://www.sjsu.edu/advising/) 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), <http://www.sjsu.edu/senate/docs/S12-7.pdf>, requires students to obtain instructor's permission to record the course and the following items to be included in the syllabus:

- “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.”
 - It is suggested that the greensheet include the instructor's process for granting permission, whether in writing or orally and whether for the whole semester or on a class by class basis.
 - In classes where active participation of students or guests may be on the recording, permission of those students or guests should be obtained as well.
- “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](http://www.sjsu.edu/senate/docs/S07-2.pdf) 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](http://www.sjsu.edu/studentconduct/) 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](http://www.sjsu.edu/president/docs/directives/PD_1997-03.pdf) 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](http://www.sjsu.edu/aec) (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](http://www.sjsu.edu/senate/docs/S14-7.pdf) at <http://www.sjsu.edu/senate/docs/S14-7.pdf>.

Student Technology Resources

Computer labs for student use are available in the [Academic Success Center](http://www.sjsu.edu/at/asc/) at <http://www.sjsu.edu/at/asc/> located on the 1st floor of Clark Hall and in the Associated Students Lab on the 2nd floor of the Student Union.

Additional computer labs may be available in your department/college. Computers are also available in the Martin Luther King Library. A wide variety of audio-visual equipment is available for student checkout from Media Services located in IRC 112. These items include DV and HD digital camcorders; digital still cameras; video, slide and overhead projectors; DVD, CD, and audiotape players; sound systems, wireless microphones, projection screens and monitors.

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

Date	Lecture	Notes
01/28/16	Green Sheet Review	
02/02/16	Introduction to CS47 / Computer	Submit Prerequisite Survey & Syllabus Agreement
02/04/16	Computer Organization	HW01 is published
02/09/16	Number Representation	
02/11/16	Programming a computer	
02/16/16	Assembler / Linker /Loader	Add code will be supplied through e-mail by Feb 12,2016
02/18/16	SPIM simulator	
02/23/16	Memory Usage I	Programming assignment 1 Submission
02/25/16	Memory Usage II	Programming assignment 2 Submission
03/01/16	MIPS Assembly Language, Arithmetic & Logic Instructions	Programming assignment 3 Submission
03/03/16	Comparison, branch & jump Instruction	
03/08/16	Memory Alignment	Programming assignment 4 Submission
03/10/16	Procedure Call	Programming assignment 5 Submission
03/15/16	Example 'printf' procedure call	Programming assignment 6 Submission
03/17/16	Midterm Exam (during your class meeting time)	
03/22/16	Boolean Algebra I	HW01 Submission , HW02 is published
03/24/16	Boolean Algebra II	Programming assignment 7 Submission , Project is published
03/29/16	Spring Break (No Class)	
03/31/16	Spring Break (No Class)	
04/05/16	Logic gates & storage elements	Programming assignment 8 Submission
04/07/16	Logic Circuit Design	
04/12/16	Logic Design Components	
04/14/16	Addition / Subtraction Logic	
04/19/16	Multiplication Logic	
04/21/16	Division Logic	HW02 Submission
04/26/16	Floating Point Number Representation	
04/28/16	Exceptions & Interrupts	
05/03/16	Review I	
05/05/16	Review II	Project Submission
05/10/16	Review III	
05/12/16	Review IV	
05/19/16	Final Exam @ SEC 01 – 5:15 PM – 7:30 PM (DH351) @ SEC 02 – 7:45 PM – 10:00 PM (MH233)	