Computer Architecture

CSIS 2810

Course Description

CSIS-2810 is designed to give CS majors a fundamental understanding of past and present-day computer architecture and design in the application of micro-processor systems. Content includes computer system design, structure, organization, and operation. Arithmetic, memory systems, performance, interfacing with peripherals and assembly language programming are also covered.

Pre-Requisite(s): CSIS 1410
Semester(s) Taught: Fall & Spring

Course Student Learning Outcomes

- Students will gain a basic understanding of each of the following topics as they impact the hardware/software interface: integer, floating point, character formats, instruction set formats, the direct relationship between assembly language instructions and machine instructions, computer arithmetic, Datapath and control, pipelining, memory hierarchies, peripherals.

- Develop the logic and write the assembly language source code that performs the necessary numerical calculations and other operations to solve a computerbased problem.
- Develop electronic digital system based in prototype micro controlled.

Course Prerequisites

CSIS 1410

Communication Plan

My goal is to respond to email within 2 business days.

The best way to contact me is via the Canvas Inbox, as I will prioritize this email over other modes of communication.

Required Text or Materials

Title: Computer Organization and Design MIPS Edition
ISBN: 978-0-12-407726-3
Authors: David A. Patterson and John L. Hennessy
Publisher: Morgan Kaufmann Publishers, Inc.,
Publication Date: 2014
Edition: 5th Edition
OID: https://booksite.elsevier.com/9780124077263/?ISBN=9780124077263

For more information on textbook accessibility, contact Accessibility & Disability Services at ads@slcc.edu.

Required Microcontroller for Term Group Project

You will be participating in a group project for this course. I would recommend waiting on purchasing your microcontroller until your team has decided on what you are going to do.

Approved microcontrollers:

- **Ardunio Nano**
- **Ardunio UNO**
    - A good intro to the Arduino UNO:

    https://www.youtube.com/watch?v=09zfRaLEasY&list=PLZfay8jtbyJt6gkkOgeeapCS_UrsgfuJA

- **Raspberry Pi Pico** - (note that most of these will require soldering)

(other microcontrollers may work but must be approved first)

Brief Description of Assignments/Exams

- **Homework, Labs, & Quizzes (40%) :** Homework assignments are usually due one week after the lecture on that subject.
    - Include your name, and class section
    - Each problem should be clearly identified
    - If you worked with another student you must list their name(s)
    - Your answer must be clearly identified by highlighting or boxing in
    - Late work may be submitted up to one week (7 calendar days) following the due date, but a 20% penalty will be assessed. Homework will not be accepted more than one week after the due date.
- **Midterm Exams (20%):** Two midterm exams will be given. If you will not be present for a scheduled exam, you must notify me ahead of time so that arrangements can be made. Without prior arrangements you may still take the exam, but a 20% penalty will be assessed.
- **Microcontroller Project (30%):** You will participate in a group project involving at least one microcontroller and write a white paper based on the project. You will also create and give a presentation summarizing your project. You will present your paper to the class.
- **Final Exam (10%):** A comprehensive final will be given during finals week.

Grading Scale

A	94% - 100%
A-	90% - 93%
B+	87% - 89%
B	84% - 86%
B-	80% - 83%
C+	77% - 79%
C	74% - 76%
C-	70% - 73%
D+	67% - 89%
D	64% - 66%
D-	60% - 63%
E	59% and below

How to Navigate to Canvas

Online Tutoring

Students at SLCC have access to online tutoring through Canvas. From your Canvas course click Online Tutoring in the course navigation and follow the steps to set up an appointment. If this is your first time using the Online Tutoring we recommend you click "Take a Tour" to familiarize yourself with the service.

Note that students only receive 480 minutes of tutoring time each semester. After that we encourage you to use the resources found through this link: https://www.slcc.edu/tutoring/index.aspx

If you have any additional questions reach out to elearningsupport@slcc.edu.

Institutional Policies

As members of our academic community, we would like to invite you to review the Institutional Syllabus which covers important policies and procedures. This document

contains important links for students on the code of student rights and responsibilities, academic integrity, and grading policies, Title IX and other important acknowledgements. By familiarizing yourself with this information, you can help us create a safe and respectful environment for everyone.

You can access the document by clicking on the following link: https://slcc.instructure.com/courses/530981/pages/institutional-syllabus

Learning Support and Tutoring Services

We are pleased to offer a range of tutoring and learning support services to help you achieve your academic goals. Whether you need assistance with a specific subject or want to improve your study skills, you have many options for tutoring or other support.

To learn more about the services we offer and how to access them, please visit the Institutional Syllabus under the Tutoring and Learning Support tab: https://slcc.instructure.com/courses/530981/pages/institutional-syllabus. We encourage you to take advantage of these resources to help you succeed in your studies. If you have any questions or would like to schedule a tutoring session, please don't hesitate to reach out to us. We are here to support you in any way we can.

Advising and Counseling Support Services

At our institution, we are committed to supporting your academic and personal growth. That's why we offer a range of advising and counseling services to help you navigate the challenges of college life. To learn more about the resources available to you and how to access them, please visit the Institutional Syllabus under the Advising and Counseling Support Services tab: https://slcc.instructure.com/courses/530981/pages/institutional-syllabus. Our advising team and the support centers across campus are here to support you in achieving your goals and overcoming any obstacles you may face.

Student Academic Calendar

As students you should be aware of all important dates in the semester, such as the day that courses begin and end, as well as the drop date and the last day to withdraw. To learn more about those dates, navigate to the Student Academic Calendar below:

SLCC Student Academic Calendar

Assignment Schedule

Due Date	Assignment Name	Assignment Type	Points
	Iterations	Discussion	0
8/25	2810 - Introduce Yourself	Discussion	15
8/25	Introduction Quiz	Quiz	10
8/27	Assignment 1 - Performance	Assignment	20
9/3	Assignment 2b: Current Event 1	Assignment	10
9/3	Quiz 2a MIPS Instructions	Quiz	10
9/10	Assignment 3a - First Assembler Program	Assignment	25
9/10	Assignment 3b - Procedures	Assignment	10
9/15	Term Project - Teams	Discussion	5
9/17	Assignment 4 - MIPS Procedure Call	Assignment	20
9/17	Assignment 5 - Array	Assignment	50
9/22	Midterm Exam 1	Quiz	100
9/22	Project Scope	Assignment	10
9/24	Lab 1. Blink PLO-CS-5	Assignment	15
9/24	Lab 2. Traffic Light PLO-CS7	Assignment	15

Due Date	Assignment Name	Assignment Type	Points
10/1	Assignment 6 - Basics of Logic Design	Assignment	30
10/4	Exam 1 Extra Credit (10 pts)	Assignment	0
10/8	Assignment 7 - Mul, Div	Assignment	15
10/8	Assignment 8 - Floating Point	Assignment	10
10/8	Floating Point Practice Quiz	Quiz	20
10/13	Term Project Update 1	Assignment	10
10/15	Assignment 9a - Data path	Assignment	30
10/15	Assignment 9b - Processor Data Path	Assignment	40
10/22	Assignment 10 - Hazards	Assignment	30
10/27	Midterm Exam 2	Quiz	100
11/3	Term Project Update 2	Assignment	10
11/5	Assignment 11 - Cache	Assignment	100
11/12	Assignment 12 - Virtual Memory	Assignment	60
11/19	Assignment 13	Quiz	45

Due Date	Assignment Name	Assignment Type	Points
11/24	Research 02 - Paper & Presentation PLO-CS-4	Assignment	100
11/26	Assignment 14	Quiz	8
11/26	Extra Credit (15 points)	Assignment	0
12/1	Term Project - Peer Evaluation	Assignment	20
12/1	Term Project Discussion (20 pts)	Discussion	20
12/12	Final Exam	Quiz	100