Syllabus Fall 2024

- **Course:** CSCE 212
- **Instructor:** Dr. Mehdi Yaghouti
- **Email**: *Yaghouti@mailbox.sc.edu*
- **Office Number**: Room 2205, *Innovation Center Building*
- **Office hours**: Fridays 9:00am - 2:00pm

Catalog Description

Computer architecture, components and organization; memory addressing; Input/Output; instruction sets; interrupts; assembly-language programming.

- **Prerequisites:** CSCE 211 and either 145 or 206

Meeting Times

Day of Week	Time	Location
Tuesday	8:30-9:45	Innovation Center Building 1400
Thursday	8:30-9:45	Innovation Center Building 1400

Course Learning Outcomes

1. **Expalining the concept of Microarchitecture**
2. **Introducing the hardware components ALU, Memory, etc.**
3. **Explaining the Architecture and Assembly Language Programming**
4. **Explaining the execution process of coded instructions by CPU**
5. **Evaluating and comparing the performance of different Microarchitectures**

- **Required Textbooks:**
  - Main Textbook: **Digital Design and Computer Architecture (RISC-V Edition) by Sarah L Harris, David Harris**
  - Further Reading/Exercises: Computer Organization and Design RISC-V Edition: The Hardware Software Interface by David A. Patterson, John L. Hennessy

Required Software

- The recommended simulators for the optional projects are provided by the instructor

Topics and Timeline

This course introduces core topics in computer architecture, based on the textbook *Digital Design and Computer Architecture (RISC-V Edition)* by Sarah L. Harris and David Harris. The topics covered are:

- **Review of Digital Circuit Design:** Combinational and Sequential Logic Circuits *Chapters 2 and 3*
- **Computer Components:** Introduction to Computer Arithmetic and ALU Circuits, Memory Organization, Memory Types, Memory Addressing *Chapter 5*
- **Assembly Programming and Architecture:** Instruction Sets and Operand Types, Addressing Modes, Programming structures in Assembly *Chapter 6 (Part I)*
- **Function Calls, Machine Language, Data Representation** *Chapter 6 (Part II)*
- **Computer Microarchitecture:** CPU organaization, Single-Cycle CPU, Multi-Cycle CPU, CPU Performance Analysis *Chapter 7*

Week No.	Tuesday Session	Thursday Session
1	Lecture 1- Introduction	Lecture 2- Review on CSCE-211 (Combinational Circuits)
3	Lecture 3- Review on CSCE-211 (Sequential Circuits)	Lecture 4- Number Representation
4	Lecture 4- Computer Components	Lecture 4- Computer Arithmetic & ALU circuits
5	Lecture 5- Floating-point Representation	Lecture 5- Memory Organization
6	Lecture 5- Memory Types	Lecture 6- Architecture
7	Lecture 6- Assembly Language (Instruction set)	Lecture 6- Assembly Language (Instruction set)
8	Lecture 6- Assembly Language (Addressing Modes)	Lecture 6- Programming Structures in Assembly Language
9	Lecture 6- Function calls	Fall Break
10	Lecture 6- Machine Language	Lecture 7-Microarchitecture (Intro.)
11	Lecture 7-Microarchitecture (Single-cycle Processor)	Lecture 7-Microarchitecture (Single-Cycle Processor)
12	Canceled (Election Day)	Lecture 7-Microarchitecture (Single-Cycle Processor)
13	Lecture 7-Microarchitecture (Multi-cycle)	Lecture 7-Microarchitecture (Multicycle)
14	Lecture 7-Microarchitecture (Multi-cycle)	Lecture 7-Microarchitecture (Intro. to Pipelining) (optional)
15	Canceled (Thanksgiving Week)	Canceled (Thanksgiving Week)
16	Review Session (Final Exam)	Review Session (Final Exam)

Table 1: Weekly Topics and Timeline

Additional Notes:

- All the lecture notes are uploaded on the Blackboard educational system with the same lecture note number as designated in the timeline table.
- Assignments and optional projects are accessible through Blackboard educational system.

Final Exam Date/Time

Date	Day of Week	Time
December 12	Thursday	9:00 a.m.

Grading and assessment

Course/Textbook section	Weight
Assignments	Mandatory Submission (no score)
Quiz 1 (Review + Chapter 5)	30%
Quiz 2 (Chapter 6 [Part I])	30%
Final (Chapter 6 [Part II] + Chapter 7)	40%
Optional Projects	Bonus points up to 10%

- Grade weights add up to 110%, providing some flexibility and motivation for the students to work through the optional projects.

Grading Scale

Grade	Criteria
A	$90 \leq$ score
B+	$85 \leq$ score $< 90\%$
B	$80 \leq$ score $< 85\%$
C+	$75 \leq$ score $< 80\%$
C	$70 \leq$ score $< 75\%$
D+	$65 \leq$ score $< 70\%$
D	$60 \leq$ score $< 65\%$
F	score $< 60\%$

Table 2: Grading Scale

Disability Support

The University of South Carolina is committed to providing access to programs and services for qualified students with disabilities. If you are a student with a disability and require accommodation to participate and complete requirements for this class, notify me immediately and contact the Student Disability Resource Center:

- `http://www.sa.sc.edu/sds`
- Address: 1705 College Street, Close-Hipp, Suite 102
- Phone: 803-777-6142
- Email: sasds@mailbox.sc.edu

for verification of eligibility and determination of specific accommodations. In addition, please provide me the required accommodation letter from the Student Disability Resource Center. All course materials are available in alternative format upon request.

Academic Honesty Policy

The faculty takes violations of the University Honor Code `http://www.sc.edu/policies/ppm/staf625.pdf` seriously. Students are encouraged to review the Honor Code and to understand the consequences of any action that is proven to be a violation of the code. You are expected to practice the highest possible standards of academic integrity. Any deviation from this expectation will result in a minimum academic penalty of your failing the assignment. In addition, an honor code violation will be subject to the sanctions described in the USC Community Handbook and Policy Guide. Violations of the University Honor Code include, but are not limited to, improper citation of sources, using another student's work, and any other form of academic misrepresentation. For more information, please see the University Honor Code.