

Extended Syllabus

Course Title	COMPUTER ARCHITECTURE	Semester	2024 SPRING
Credit	3	Course Number	CSE4010
Class Time	Mon & Wed 12:00~13:15 PM	Enrollment Eligibility	Prerequisite (Intro to digital logic and circuit)

Instructor's Photo	Name: Lee Hyukjun	Homepage: ecl.sogang.ac.kr
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	Office: AS1011 Office Hours: please refer to the saint	

I. Course Overview

1. Description							
Learn the basic building blocks of computer architecture. To quantitatively analyze the performance and cost, we start with performance and cost metrics. Then we go over computer arithmetics, language interface design (asssembly), datapath and controlpath and memory hierarchy.							
2. Prerequisites							
Introduction to digital logic and circuits							
3. Course Format (%)							
Lecture	Discussion	Experiment/Practicum	Field study	Presentations	Other		
90 %	10 %	%	%	%	%		
4. Evaluation (%)							
mid-term Exam	Final exam	Quizzes	Presentations	Projects	Assignments	Participation	Other
35 %	40 %	%	%	%	20 %	5 %	%

II. Course Objectives

Knowledge: Learn various metrics to compare computer architecture. Learn language and machine interface. Learn architectural building blocks for computer systems including processor datapath and memory systems.

Skill: Learn how to analyze of performance and cost of different computer design.

Attitude:

- You are welcome to engage class discussion.
- Observe the honor code.

III. Course Format

(* In detail)

This is a lecture-based course. I encourage students to actively participate in discussion. We will use homeworks and exams to evaluate students' understanding and performance.

IV. Course Requirements and Grading Criteria

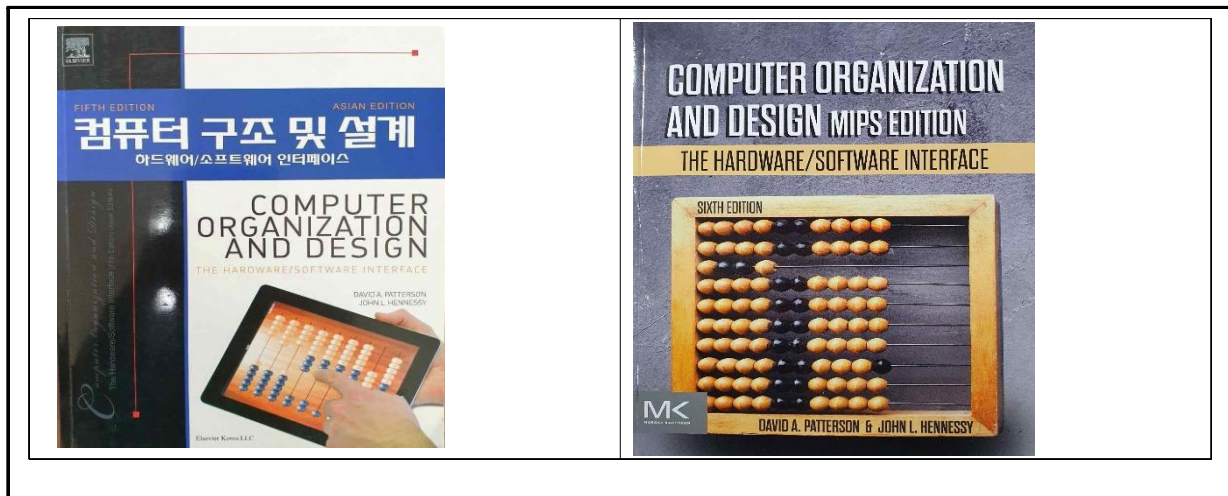
Homework, midterm and final exam will constitute 20%, 35%, 40% of the grade. And 5% will be given to participation.
– There will be 3–4 homework assignments. Late homework will be assessed a penalty of 20 % of possible score per day. Late homework won't be accepted after three days from the due date.

V. Course Policies

- Respect the instructor and others in class
- Observe the honor code (no cheating and plagiarism allowed)

VI. Materials and References

- Title: Computer Organization and Design (MIPS edition)
 - Author: John Hennessy and David Patterson
 - Edition; 5th Asian Edition or 6th Edition
- (Please refer to the cover page below)



VII. Course Schedule

(* Subject to change)

Week 1 (/)	Learning Objectives	Learn basic building blocks of computers
	Topics	Computer Abstraction and Technology I
	Class Work (Methods)	Lecture
	Materials (Required Readings)	Lecture notes/Textbook
	Assignments	
Week 2 (/)	Learning Objectives	Learn performance and cost metrics
	Topics	Computer Abstraction and Technology II
	Class Work (Methods)	Lecture
	Materials (Required Readings)	Lecture notes/Textbook
	Assignments	

Week 3 (/)	Learning Objectives	Learn language interface (MIPS assembly)
	Topics	Instructions: Language of the computer I
	Class Work (Methods)	Lecture
	Materials (Required Readings)	Lecture notes/Textbook
	Assignments	HW1
Week 4 (/)	Learning Objectives	Learn language interface (MIPS assembly)
	Topics	Instructions: Language of the computer II
	Class Work (Methods)	Lecture
	Materials (Required Readings)	Lecture notes/Textbook
	Assignments	
Week 5 (/)	Learning Objectives	Learn number systems and multiplication/division
	Topics	Arithmetic for Computers I
	Class Work (Methods)	Lecture
	Materials (Required Readings)	Lecture notes/Textbook
	Assignments	
Week 6 (/)	Learning Objectives	Learn FP multiplication/division
	Topics	Arithmetic for Computers II
	Class Work (Methods)	Lecture
	Materials (Required Readings)	Lecture notes/Textbook
	Assignments	HW2

Week 7 (/)	Learning Objectives	Introduce the datapath of CPU
	Topics	Arithmetic for Computers III/ The Processor I
	Class Work (Methods)	Lecture
	Materials (Required Readings)	Lecture notes/Textbook
	Assignments	
Week 8 (/)	Learning Objectives	Midterm
	Topics	
	Class Work (Methods)	
	Materials (Required Readings)	
	Assignments	
Week 9 (/)	Learning Objectives	Learn instruction fetch/decoding/execution and memory accesses and write back
	Topics	The Processor II
	Class Work (Methods)	Lecture
	Materials (Required Readings)	Lecture notes/Textbook
	Assignments	

Week 10 (/)	Learning Objectives	Learn pipelining techniques for instruction fetch/decoding/execution and memory accesses and write back and pipeline stalls
	Topics	The Processor III
	Class Work (Methods)	Lecture
	Materials (Required Readings)	Lecture notes/Textbook
	Assignments	
Week 11 (/)	Learning Objectives	Learn how to resolve hazard due to pipelining
	Topics	The Processor IV
	Class Work (Methods)	Lecture
	Materials (Required Readings)	Lecture notes/Textbook
	Assignments	HW3
Week 12 (/)	Learning Objectives	Learn memory hierarchy
	Topics	Large and Fast: Exploiting Memory Hierarchy I
	Class Work (Methods)	Lecture
	Materials (Required Readings)	Lecture notes/Textbook
	Assignments	
Week 13 (/)	Learning Objectives	Learn cache architecture
	Topics	Large and Fast: Exploiting Memory Hierarchy II
	Class Work (Methods)	Lecture
	Materials (Required Readings)	Lecture notes/Textbook
	Assignments	

Week 14 (/)	Learning Objectives	Learn main memory systems and cache interaction
	Topics	Large and Fast: Exploiting Memory Hierarchy III
	Class Work (Methods)	Lecture
	Materials (Required Readings)	Lecture notes/Textbook
	Assignments	HW4
Week 15 (/)	Learning Objectives	Learn how to design better memory hierarchy
	Topics	Large and Fast: Exploiting Memory Hierarchy IV
	Class Work (Methods)	Lecture
	Materials (Required Readings)	Lecture notes/Textbook
	Assignments	
Week 16 (/)	Learning Objectives	Final Exam
	Topics	
	Class Work (Methods)	
	Materials (Required Readings)	
	Assignments	

VIII.Special Accommodations

Please talk to the instruction if you need special assistance.

IX. Aid for the Challenged Students

Please talk to the instruction if you need special assistance.