



蘇州大學
Soochow University

CS 343 Computer Architecture

Summer 2024

Course Credits: 4

Contact Hours: 56 hours

Instructor: TBA

Email:TBA

COURSE OBJECTIVES

This course introduces students to the fundamental principles of computer architecture and organization, with focusing on the design and implementation of digital computers. The course covers topics such as CPU organization, processor design, memory hierarchy, input/output systems, instruction set architecture, assembly and machine language, and performance evaluation. By learning the course, students will gain practical skills in designing and analyzing the components of a digital computer system.

Upon Completion of this Course, students will be able to:

1. Understand the basic principles of computer architecture, including instruction set architecture, processor design, and memory hierarchy.
2. Design the central processing unit (CPU) and CPU control unit to execute the instruction set efficiently.
3. Explore the role of input/output systems and peripheral devices in computer architecture.
4. Design and implement an instruction set architecture (ISA) for a digital computer system.
5. Acquire techniques for evaluating the performance of digital computer designs, and explore optimization strategies to improve performance and efficiency.

PREREQUISITES

CS 301 Digital Systems



GRADING

Grades will be determined by accumulating points, with 100 points being the maximum, as follows:

ITEM	POINTS
2 Design Projects	20 Points
4 Labs	20 Points
Midterm	20 Points
Final Report	10 Points
Final Exam	30 Points
Total	100 Points

Late submissions will be graded at the end of the course. Grades will be assigned according to the following rule:

$$A \geq 90 > B \geq 80 > C \geq 70 > D \geq 60 > F.$$

We reserve the right to make adjustments to the overall grading policy.

COURSE MATERIALS

Required Texts:

Structured Computer Organization, Tanenbaum, Andrew S; Austin, Todd, 6th Edition, Pearson.

Digital design and computer architecture, Harris, David Money; Harris, Sarah L, Morgan Kaufmann Publishers, 2015.

More related works of traditional Chinese literature will be posted on the 1st day of the class.

COURSE TOPICS

MODULE	TASKS
Module 1	Topics: Topic 1: Instruction: milestones in computer architecture Topic 2: Computer Systems: CPU organization Topic 3: Primary memory



	Topic 4: Secondary memory Topic 5: Input/output Assessments: Lab 1
Module 2	Topics: Topic 6: The digital logic level: basic digital logic circuits Topic 7: Memory Topic 8: CPU chips and buses Topic 9: The instruction set: Instruction formats and types Topic 10: Flow of control Assessments: Lab 2 Design Project 1 Midterm
Module 3	Topics: Topic 11: Architecture: assembly language Topic 12: Machine language Topic 13: Microarchitecture: Single-Cycle Processor Topic 14: Multicycle Processor Topic 15: Pipelined Processor Assessments: Lab 3 Design Project 2
Module 4	Topics: Topic 16: Parallel computer Architectures: on-chip parallelism Topic 17: Coprocessors Topic 18: Shared-memory multiprocessors Topic 19: Message-passing multicomputers Topic 20: Final reviews Assessments: Lab 4 Final Report Final Exam

ATTENDANCE

1) Class attendance is required. Missing classes without permission will lead to decrease in overall grade.

Missing less than two classes: no penalty.

Missing more than two classes: 7% will be taken off from the overall grade.

If the instructor reports a student's frequent missing of class to the Soochow



University Academic Administration Office, the student might get a written warning and might be prohibited from attending final exam.

2) Participants in this course are expected to arrive in class promptly and adequately prepared. The primary objective of this course is to critically engage with the readings and the subject matter. Therefore, course participants are expected to have completed the reading prior to class and prepare thoughtful reflections/commentaries to share with fellow colleagues.

LEARNING REQUIREMENTS

- 1) Late assignments are not acceptable and are subjected to grade deductions.
- 2) Assignments submitted in the wrong format will be counted as not submitted.
- 3) Failure to submit or fulfill any required course component results in failure of the class.
- 4) Make-up for midterm and final exams only with valid excuses, as defined by the University.
- 5) In order to earn a Certificate of Completion, participants must thoughtfully complete all assignments by stated deadlines and earn an average quiz score of 50% or greater.

TECHNOLOGY POLICY

The use of electronic devices in class is distracting, both for the user and for the rest of the class. Only non-programmable calculators can be used in the tests and exam. Any attempts to use cell phones and other electronic communication devices will be seemed as cheating. Laptops are discouraged, unless you use them for activities DIRECTLY related to the course (eg., note taking, reading course documents).

ACADEMIC INTEGRITY POLICY

Soochow University highly values the academic integrity and aims to promote the academic fairness, honesty and responsibility. Any academic dishonesty behaviors and any attempts to cheats and plagiarism will be reported to the university administration office. A written warning and the relevant penalties will be imposed. The record might be shown on the official university transcript.



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DISABILITY ACCOMMODATION

Soochow University is committed to maintaining a barrier-free environment so that students with disabilities can fully access programs, courses, services, and activities at Soochow University. Students with disabilities who require accommodations for access to and/or participation in this course are welcome.

Note:

Please contact the University Administrative Office immediately if you have a learning disability, a medical issue, or any other type of problem that prevents professors from seeing you have learned the course material.