

The Hong Kong University of Science and Technology
UG Course Syllabus (Fall 2026-27)

[Course Title] Computer Organization

[Course Code] COMP 2611

[No. of Credits] 4 credits

[Any pre-/co-requisites] COMP 2011 OR COMP 2012H; Exclusion(s): ELEC 2350

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Course Description

Inner workings of modern digital computer systems and tradeoffs at the hardware-software interface. Topics include: digital logic, data and instruction representation, instruction set architecture, assembly language programming, computer arithmetic, processor, pipelining, and memory systems. Prerequisite(s): COMP 2011 OR COMP 2012H. Exclusion(s): ELEC 2300, ELEC 2350

List of Topics

Introduction of digital logic
Data representation
MIPS ISA and assembly
Computer Arithmetic
Processor: Datapath and Control
Pipelined Processor
Memory System

Intended Learning Outcomes (ILOs)

By the end of this course, students should be able to:

1. Understand the basic concepts of digital logic and build the small circuits involved in computer systems
2. Describe the interaction between software and hardware and instruction set architecture
3. Write and execute small programs of a few hundred lines in assembly language
4. Define the basic concepts of modern computer hardware, including datapath, control, memory and input/output
5. Describe the organizational paradigms that determine the capability and performance of computer systems

Assessment and Grading

This course will be assessed using criterion-referencing and grades will not be assigned using a curve. Detailed rubrics for each assignment are provided below, outlining the criteria used for evaluation.

Assessments:

Assessment Task	Contribution to Overall Course grade (%)	Due date
Mid-Term	30%	Week 7 or Week 8
4 Homework	15%	Week 4, Week 6, Week 10, Week 12
Programming Assignment	15%	Last day of Fall term
Final examination	40%	Final exam period

* Assessment marks for individual assessed tasks will be released within two weeks of the due date.

Mapping of Course ILOs to Assessment Tasks

Assessed Task	Mapped ILOs	Explanation
Individual homework	ILO1, 2, 5	Continuous assessments which are designed to measure how well students have learned the fundamentals and major concepts of computer organization and architecture.
Individual programming project	ILO3	
Midterm	ILO1, 2, 4, 5	
Final exam	ILO1, 2, 4, 5	Final examination questions are designed to see how far students have achieved their intended learning outcomes.

Grading Rubrics

Course Learning Outcome	Exemplary (A- to A+)	Competent (C to B+)	Needs Work (D to C-)	Unsatisfactory (F)
1. Digital Logic	Demonstrates thorough theoretical knowledge and a high degree of correctness in designing small circuits.	Demonstrates sufficient theoretical knowledge and a considerable degree of correctness in circuit design.	Demonstrates some theoretical knowledge and some degree of correctness in circuit design.	Demonstrates limited theoretical knowledge and a low degree of correctness in circuit design.
2. HW/SW Interaction	Demonstrates thorough knowledge and understanding of the design principles of instruction set architecture.	Demonstrates sufficient knowledge and understanding of the design principles of instruction set architecture.	Demonstrates some knowledge and understanding of the design principles of instruction set architecture.	Demonstrates limited knowledge and understanding of the design principles of instruction set architecture.

3. Assembly Programming	Program correctly handles all test cases; code is very efficient with clear logic.	Program correctly handles the majority of test cases; code is fairly efficient and easy to read.	Program correctly handles around half of test cases; code works by brute force and is not easy to read.	Program fails the majority of test cases; code appears patched together without logic.
4. Computer Hardware Concepts	Demonstrates thorough theoretical knowledge and a high degree of correctness in describing datapath, control, and memory.	Demonstrates sufficient theoretical knowledge and a considerable degree of correctness.	Demonstrates some theoretical knowledge and some degree of correctness.	Demonstrates limited theoretical knowledge and a low degree of correctness.
5. System Performance	Able to clearly analyze and compare computer performance in all given circumstances.	Able to analyze and compare computer performance in most given circumstances.	Able to analyze and compare computer performance in some given circumstances.	Fails to analyze and compare computer performance in most given circumstances.

Final Grade Descriptors:

- Grade A (A- to A+): The student demonstrates thorough theoretical knowledge and a high degree of correctness across all learning outcomes. They can write highly efficient and correct assembly programs and clearly analyze performance in all circumstances.
- Grade B/C (C to B+): The student demonstrates sufficient theoretical knowledge and a considerable degree of correctness. They can write fairly efficient assembly programs that handle the majority of cases and can analyze performance in most circumstances.
- Grade C-/D (D to C-): The student demonstrates some theoretical knowledge and some degree of correctness. Their assembly programs handle about half of the test cases, and they can analyze performance in some, but not all, circumstances.
- Grade F: The student demonstrates limited theoretical knowledge and a low degree of correctness. Their programs fail most test cases, and they are unable to analyze computer performance in most situations.

Course AI Policy

No generative artificial intelligence tools should be used to complete assessment tasks.

Communication and Feedback

Assessment marks for individual assessed tasks will be communicated via Canvas within two weeks of submission. Students are allowed to review their marks and send appealing requests within three working days.

Resubmission Policy

No resubmission of assessment tasks. Student with difficulties (e.g. psychological, special education needs, etc.) should approach the instructor before the deadline

Required Texts and Materials

Computer Organization and Design MIPS Edition: The Hardware/Software Interface
6th Edition

Academic Integrity

Students are expected to adhere to the university's academic integrity policy. Students are expected to uphold HKUST's Academic Honor Code and to maintain the highest standards of academic integrity. The University has zero tolerance of academic misconduct. Please refer to [Academic Integrity | HKUST – Academic Registry](#) for the University's definition of plagiarism and ways to avoid cheating and plagiarism.

Additional Resources

N/A