The Hong Kong University of Science and Technology

UG Course Syllabus (Spring 2025-26)

[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
4 Homework	15%	Week 3, 5, 9, 11
Programming Assignment	15%	Week 13
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

Final Grade Descriptors:

Grades	Short Description	Elaboration on subject grading description
A	Excellent Performance	Demonstrates thorough theoretic knowledge of digital logic design principles. Has a high degree of correctness in designing small circuits. Demonstrates thorough knowledge and understanding of the design principles of instruction set architecture. Program correctly handles all specified test cases. The code is very efficient with clear logic, easy to read and understand. Demonstrates thorough theoretic knowledge of computer hardware and design principles Has a high degree of correctness in describing datapath and control of given machine instruction, and memory structure. Able to clearly analyze and compare computer performance in all given circumstance.
B	Good Performance	Demonstrates sufficient theoretic knowledge of digital logic design principles. Has a considerable degree of correctness in designing small circuits. Demonstrates sufficient knowledge and understanding of the design principles of instruction set architecture. Program correctly handles majority of test cases The code is fairly efficient, easy to read and understand.

		Demonstrates sufficient theoretic knowledge of computer hardware and design principles Has a considerable degree of correctness in describing datapath and control of given machine instruction, and memory structure. Able to analyze and compare computer performance in most given circumstances.
C	Satisfactory Performance	Demonstrates some theoretic knowledge of digital logic design principles. Has some degree of correctness in designing small circuits. Demonstrates some knowledge and understanding of the design principles of instruction set architecture. Program correctly handles around half of test cases The code works because of brute force; it's not easy to read and understand. Demonstrates some theoretic knowledge of computer hardware and design principles Has some degree of correctness in describing datapath and control of given machine instruction, and memory structure. Able to analyze and compare computer performance in some given circumstances.
D or F	Marginal Pass Fail	Demonstrates limited theoretic knowledge of digital logic design principles. Has a low degree of correctness in designing small circuits. Demonstrates limited knowledge and understanding of the design principles of instruction set architecture. Program fails majority of test cases The code is huge and appears to be patched together without logic. Demonstrates limited theoretic knowledge of computer hardware and design principles Has a low degree of correctness in describing datapath and control of given machine instruction, and memory structure. Fails to analyze and compare computer performance in most given circumstances.

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