The Hong Kong University of Science and Technology

UG Course Syllabus

Introduction to Computer Organization and Design

ELEC 2350

4 credits

Pre-requisite: ELEC 1100; Exclusion: COMP 2611, ELEC 2300, ISDN 4000F

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Course Description

This is an introductory course in computer hardware and software organization. The topics covered include computing systems, computing programming, hardware-software collaboration, computer arithmetic, computer hardware organizations and operations, parallel processing, memory technologies and organization, and technology trends

Intended Learning Outcomes (ILOs)

On successful completion of this course, students will be able to:

ILO1 - Understanding the typical computer hardware and software components and computer technology trends.

ILO2 – Understanding typical instruction set architecture and assembly programming method.

ILO3 – Use computer arithmetic techniques to represent and process data in computers.

ILO4 – Use typical methods to evaluate computer performance.

ILO5 – Understanding the digital logic circuit (Combinational Logic and Sequential Logic Circuit)

ILO6- Use a typical computer system design flow to systemically develop single-cycled processor architectures including datapath and control for an instruction set.

ILO7 – Systematically develop basic multi-cycle pipelined processor architecture for an instruction set and handle hazards.

ILO8 – Understand memory hierarchies and use cache to handle temporal and spatial locality in programs.

Assessments and Grading

The course will be assessed using criterion-referencing and grade will not be assigned using a curve.

Assessment Summary Table:

Assessment Task	Contribution to Overall Course Grade (%)	Due Date
2 Homework Assignments	10% (5% each)	Week 7, Week11
4 Laboratory Experiments	20% (5% each)	Week 4 to Week 11
Midterm Exam	25%	Week 8
Final Exam	45%	Finals Week

Mapping of Course ILOs to Assessment Tasks

Assessment Task	Mapped ILOs	Explanation
Homework	ILO1-ILO7	These assignments will assess students' ability to understand the concepts and knowledge in computer architecture
Midterm Exam	ILO1, ILO2, ILO3, ILO4	These assignments will reflect on students' ability to understand the concepts and knowledge in computer architecture
Final Exam	ILO1 – ILO8	These assignments will reflect on students' ability to understand the concepts and knowledge in computer architecture
Laboratory Experiment	ILO02, ILO3, ILO5, ILO6	These lab tasks require students to have a good understand on the concept of

		the important component of computer architecture .

Grading Rubrics

Detailed grading rubrics will be provided on Canvas. These rubrics clearly outline the criteria used for awarding points. Students can refer to these rubrics to understand how their work will be assessed.

Final Grad Descriptors:

Grades	Short Description	Elaboration on subject grading description
A	Excellent Performance	Demonstrates a comprehensive grasp of subject matter, expertise in problem-solving, and significant creativity in thinking. Exhibits a high capacity for scholarship and collaboration, going beyond core requirements to achieve learning goals.
B	Good Performance	Show some good knowledge and understanding of the main subject matter, competence in problem-solving, and the ability to analyze and evaluate issues. Displays high motivation to learn and the ability to work effectively with others.
C	Satisfactory Performance	Possesses adequate knowledge of core subject matter, competence in dealing with familiar problems, and some capacity for analysis and critical thinking. Shows persistence and effort to achieve broadly defined learning goals.
D	Marginal Pass	Show threshold knowledge of core subject matter, potential to achieve key professional skills, and the ability to make basic judgements. Benefits from the course and has the potential to develop in the discipline.
F	Fail	Demonstrates insufficient understanding of the subject matter and lacks the necessary problem-solving skills. Shows limited ability to think critically or analytically and exhibits minimal effort towards achieving learning goals. Does not meet the threshold requirements for professional practice or development in the discipline.

Course AI Policy

This course encourages the use of generative artificial intelligence.

Communication and Feedback

Assessment marks for individual assessed tasks will be communicated via Canvas within two weeks of submission. Students who have further questions about the feedback including marks should consult the instruction within 1 week after the feedback is received.

Required Texts and Materials

D. Patterson & J. Hennessy, Computer Organization and Design: The Hardware/Software Interface

(5th 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.