



UNIVERSITI TEKNOLOGI MARA

CSC429: COMPUTER ORGANIZATION AND ARCHITECTURE

Course Name (English)	COMPUTER ORGANIZATION AND ARCHITECTURE APPROVED
Course Code	CSC429
MQF Credit	3
Course Description	This course introduces students to the organization and architecture of computer systems, beginning with the standard Von Neumann model and moving forward to more recent architectural concepts. Its goal is to study the evolution of computer architecture and the factors influencing the design of hardware and software elements of computer systems. Topics covered may include instruction-set architecture; number representation; processor micro-architecture; cache and memory organizations; input and output organization and architecture. By attending this course, the students will be exposed to the core computer components and will provide better understanding on computer performance and processing.
Transferable Skills	Demonstrate ability to understand and apply computer organization and architecture in every day activities in order to analyse issues/problems and provide appropriate solution.
Teaching Methodologies	Lectures, Tutorial
CLO	CLO1 Explain design and development of computer systems for a variety of purposes CLO2 Demonstrate communication skills in Computer Architecture and Organization CLO3 Demonstrate autonomous learning in Computer Architecture and Organization
Pre-Requisite Courses	No course recommendations
Topics	
1. Introduction 1.1) Overview and history of computer architecture 1.2) Basic organization of von Neumann machine 1.3) Fundamental of building blocks 1.4) Logic expressions 1.5) Register transfer notation	
2. Machine Level Representation of Data 2.1) Bits, bytes and words 2.2) Numeric data representation and number bases 2.3) Conversion between bases 2.4) Arithmetic and logic operations 2.5) Floating point notation using IEEE format 2.6) 2.6 Signed and twos- complement representations	
3. Memory System Organization and Architecture 3.1) Storage systems and their technology 3.2) Coding, data compression and data integrity 3.3) Memory hierarchy 3.4) Main memory I/O organization and operations; read/write	
4. Interfacing and Communication 4.1) I/O fundamental; handshaking, buffering, programmed I/O, interrupt-driven I/O, polling 4.2) Interrupt structures; vectored and prioritised, interrupt acknowledgement, usage 4.3) External storage, physical organization and drives 4.4) Buses; bus protocols, arbitration, direct-memory access (DMA) 4.5) Stack, functions of stacks – interrupt, subroutine, and stack operations; push/pop	

5. Instruction Set Architectures (ISAs)

- 5.1) Instruction set design
- 5.2) Processor Architectures

6. Advanced Architectures

- 6.1) Overview of Parallel Processing
- 6.2) Issues in Parallel Platforms

Assessment Breakdown	%
Continuous Assessment	50.00%
Final Assessment	50.00%

Details of Continuous Assessment	Assessment Type	Assessment Description	% of Total Mark	CLO
	Assignment	n/a	5%	CLO3
	Individual Project	n/a	15%	CLO2
	Quiz	n/a	10%	CLO3
	Test	n/a	20%	CLO1

Reading List	Recommended Text	<ul style="list-style-type: none"> • David A. Patterson, John L. Hennessy 2013, <i>Computer Organization and Design</i>, Morgan Kaufmann [ISBN: 0124077269] • Alan Clements 2013, <i>Computer Organization & Architecture: Themes and Variations</i>, Cengage Learning [ISBN: 9781111987046] • Paul Whatmough, Gu-Yeon Wei 2017, <i>Deep Learning for Computer Architects (Synthesis Lectures on Computer Architecture)</i>, Morgan & Claypool Publishers [ISBN: 1627057285] • Molly Wright Steenson 2017, <i>Architectural Intelligence</i>, MIT Press [ISBN: 0262037068]
	Reference Book Resources	<ul style="list-style-type: none"> • William Stallings, Peter Zeno 2016, <i>Computer Organization and Architecture</i>, 10 Ed. [ISBN: 9781292096858]
Article/Paper List	This Course does not have any article/paper resources	
Other References	This Course does not have any other resources	