UNIVERSITI TEKNOLOGI MARA

CSC159: COMPUTER ORGANIZATION

Course Name (English)	COMPUTER ORGANIZATION APPROVED
Course Code	CSC159

MQF Credit	4

Course Description	A deep understanding on the concepts of computer architecture is essential in the field of computer science. Students will be exposed to the structure and function of the computer and its components. Students will be introduced to assembly language to demonstrate the strong correspondence between the language and the computer architecture's machine code instructions.

Transferable Skills	Reflective Learner Resourceful & Responsible Independent & Critical Thinker Systematically Inquisitive Solution Provider

Teaching Methodologies	Lectures, Lab Work

CLO		
	CLO1	Describe the structure and operation of digital computers .
	CLO2	Discover the mechanics of data transfer and control within a digital computer system.
	CLO3	Construct assembly language programming to solve basic computing problems.

Pre-Requisite Courses	No course recommendations

Topics
1. Digital System and Logic 1.1) Logic gates (AND, OR, NOT, XOR) 1.2) Truth tables 1.3) Combinational logic circuits
2. Machine Level Representation of Data 2.1) Numeric conversion between number bases (binary, decimal, octal, hexadecimal) 2.2) Fractional Conversions 2.3) Representations for signed integers (sign-and-magnitude, 1s complement and 2s complement) 2.4) Arithmetic operations (addition and subtraction) 2.5) Floating Point format (IEEE 754 standard - single precision)
3. The CPU and Memory: Organization 3.1) Components of CPU (Control Unit and ALU) 3.2) Registers, buses and clock 3.3) Types of Memory (RAM and ROM) 3.4) Memory Hierarchy 3.5) Memory Operations 3.6) Memory Capacity
4. CPU and Memory: Design and Enhancements 4.1) Fetch-execute Instruction Cycle 4.2) CPU Architectures 4.3) CPU Enhancements (Separate fetch/execute unit, pipelining, multiple parallel execution units, superscalar processing, multiprocessing) 4.4) Memory Enhancements (wide path memory access, memory interleaving, cache memory)

5. Interfacing and communication
5.1) Peripherals
5.2) I/O considerations (speed and coordination issues)
5.3) Programmed I/O
5.4) I/O Modules
5.5) Interrupts and Stacks
5.6) Direct Memory Access (DMA)
5.7) I/O System Architectures (Bus architecture and channel architecture)

6. Assembly language
6.1) Elements of Assembly Language (Intel 8086/8088 architecture – statements, operands, addressing modes and registers)
6.2) Data Transfer Instructions
6.3) Arithmetic Instructions
6.4) Boolean Instructions
6.5) Shift/Rotate Instructions
6.6) Comparison Instructions
6.7) Control Transfer Instructions
6.8) Condition Codes Instructions

Assessment Breakdown	%
Continuous Assessment	60.00%
Final Assessment	40.00%

Details of Continuous Assessment	Assessment Type	Assessment Description	% of Total Mark	CLO
	Assignment	Assignment 1	10%	CLO1
	Assignment	Assignment 2	10%	CLO1
	Lab Exercise	Lab Assignment 1	5%	CLO3
	Lab Exercise	Lab Assignment 2	5%	CLO3
	Lab Exercise	Lab Assignment 3	5%	CLO3
	Test	Lab Test	10%	CLO3
	Test	Test	15%	CLO2

Reading List	Reference Book Resources	**Irv Englander 2014,** *The Architecture of Computer Hardware, Systems Software, and Networking*, **4 Ed., Wiley [ISBN: 9781118322635]**
		William Stallings & Peter Zeno 2015, *Computer Organization and Architecture: Designing for Performance*, **10 Ed., Pearson [ISBN: 9781292096858]**
		Andrew S. Tanenbaum & Todd Austin 2016, *Structured Computer Organization*, **6 Ed., Pearson Education Dorling Kindersley [ISBN: 9789332571242]**
		David Harris,Sarah Harris 2015, *Digital Design and Computer Architecture*, **2 Ed., Morgan Kaufmann Pub [ISBN: 9780128000564]**
		David Patterson,John L. Hennessy 2017, *Computer Organization and Design*, **5th Ed., Morgan Kaufmann Series in Comp [ISBN: 9780128122754]**
		Kip R. Irvine,Lyla B. Das 2014, *Assembly Language for X86 Processors, Global Edition*, **7 Ed., Pearson Higher Education & Professional Group [ISBN: 9781292061214]**
		Mazliana Hasnan, Azlin Dahlan, Norazmah Mat Yusoff and Rozmawati Mohd Yusoff 2007, *Assembly Language: A Handbook*, **1 Ed., 12, UPENA, UiTM Malaysia [ISBN: 9789833644216]**
Article/Paper List	This Course does not have any article/paper resources	
Other References	This Course does not have any other resources	