Faculty of Engineering & Technology

Digital Systems and Computer Organization

Information :

Course Code :	CMP 334	**Level** :	Undergraduate	**Course Hours :**	3.00- Hours

Department :	Department of Electrical Engineering

Instructor Information :

Title	Name	Office hours
Professor	Khaled Mohamed Amin Mohamed Abdelmonem Zayed	
Assistant Lecturer	Mohamed Essam Abd El Aziz Abd El Aal	
Teaching Assistant	Ahmed Mahmoud Mohamed Mahmoud Hegazy	1
Teaching Assistant	Samar Abdelmohaimen Mohamed Soliman	
Teaching Assistant	Hamdy Sherif Hamdy Amin Elshehaby	

Area Of Study :

1-Train students on the fundamental principles of computer architecture using a breadth approach
2-Train students to evaluate quantitatively the performance of any computer system
3-Develop the student's knowledge of the architectural techniques used to design and build
4-modern high-performance microprocessors and microcomputers
5-Provide students with the basic concepts of instruction set architecture and related design principles

Course outcomes :

a.Knowledge and Understanding: :

1 -	Outline fundamentals in computing, including hardware and operating systems.
2 -	Describe functions of the basic building blocks of a computer system.
3 -	Show a critical understanding of the broad context within computing including issues of reliability.
4 -	Discuss how computers execute instructions.
5 -	Explain the basic operations of cache and main memory, I/O operations, bus, interrupt and peripheral devices as well as analyzing the performance of different designs.
6 -	Discuss some aspects of the subject, such as parallel processing.
7 -	Define and assess criteria for measuring the extent to which a computer system is appropriate for its current deployment and future evolution.
8 -	Discuss and identify current and underlying technologies that support computer processing and inter-computer communication.

b.Intellectual Skills: :

1 -	Identify various architectures and explain the design concepts for analyzing computer systems.
2 -	Sequence complete computer instructions.
3 -	Identify attributes and components of computer systems.

| 4 - | Identify a range of solutions and critically evaluate and justify them. |
| 5 - | Define and assess criteria to measure the appropriateness of a computer system for its current deployment and future evolution, and to interpret the results thereof. |

c.Professional and Practical Skills: :

1 -	Simulate micro instruction executions.
2 -	Specify, investigate, analyze, design and develop computer-based systems using appropriate tools and techniques.
3 -	Operate computing equipment efficiently, taking into account its logical and physical properties

d.General and Transferable Skills: :

1 -	Work in stressful environment and within constraints.
2 -	Manage tasks and resources
3 -	Communicate effectively.
4 -	Manage one's own learning and development, including time management and organizational skills.

Course Topic And Contents :

Topic	No. of hours	Lecture	Tutorial / Practical
Basic Computer Architecture and Microprocessors : Von Neumann architecture. Review of Digital circuit and Digital Components: Logic Gates. Boolean Function and Simplifications. Combinational Circuit and Sequential circuit. Decoders and Multiplexers. Registers and Counters.	5	3	2
Data Representation: Number Systems. Complements. Fixed-point representation (Addition, subtraction, overflow). Floating-point representation.	5	3	2
Register Transfer and Micro-operations. Register Transfer. Bus and Memory Transfers. Arithmetic Micro-operations. Logic Micro-operations. Shift Micro-operations.. Arithmetic Logic Shift Unit.	10	6	4
Basic Computer Organization and Design: Instruction. Codes. Computer Instructions. Timing and Control. Instruction Cycle. Instruction Types :Memory-Reference Instructions, Register-Reference Instructions, Input/Output Instructions. Program Interrupt.	5	3	2
Micro programmed Control Unit: Control Memory. Address Sequencing. Micro-instruction Format. Mapping of Instruction. Micro-program	10	6	4
Central Processing Unit: General Register Organization. Stack Organization. Instruction Format. Addressing Modes.	10	6	4
Input-Output Organization: I/O Bus and interface modules. I/O versus Memory Bus. Priority Interrupt. Direct Memory Access (DMA).	10	6	4

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Course Topic And Contents :

Topic	No. of hours	Lecture	Tutorial / Practical
Memory Organization: Memory Hierarchy. Associative Memory: Translation Look-aside Buffer (TLB). Cache Memory: Addressing, Mapping, Block size, Replacement.	10	6	4

Teaching And Learning Methodologies :

Lectures

Tutorials

Course Assessment :

Methods of assessment	Relative weight %	Week No	Assess What
Assignments/project	15.00	6	to assess the skills of problem solving, understanding of related topics
Attendance/Performance	5.00	14	to asses the performance of the students through the overall
Final-term examination	40.00	15	to assess the comprehensive understanding of the scientific background of the course, to assess the ability of problem solving with different techniques studied.
Mid-Term 1	15.00	7	to assess the skills of problem solving, understanding of related topics
Mid-Term 2	15.00	11	to assess the skills of problem solving, understanding of related topics
Quiz 1	5.00	5	to assess the skills of problem solving, understanding of related topics
Quiz 2	5.00	9	to assess the skills of problem solving, understanding of related topics

Recommended books :

Computer System Architecture, M. Morris Mano. Prentice Hall, International edition, Most Recent Edition.

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