

211 CNE Course Syllabus

Course Code	211 CNE
Course Name	Computer Design and Organization
Credit Hours	3
Contact Hours	4
Instructor Name	Dr. Ahmed NEFFATI

Text Book (title, author, and year)

- Computer Organization and architecture, William Stallings, 2006.
- Fundamentals of Computer Organization and Architecture, Mostapha Abdelbar and Hishem Erraouini, 2005.

Specific Course Information

Catalog Description	This course introduce the elements of computer system, design, timing, Instructions and Control, Register transfer and Micro operation, Basic Computer Organization, Central Processing Unit and Design, and Memory Organization.
Prerequisites	CPE 120.
Co-requisites	NIL
Required/Elective	required

Course Learning Outcomes

1	To outline the mathematical methods used for implementing computer data representations, and how to convert them from one form to another.
2	To list the computer generations, and describe the technology of modern computer systems and relate them to real examples implemented in commercially successful products.
3	To define the basic components of a computer system including CPU, memories, and input/output devices and explain the main components of CPU.
4	To conduct professional experiments for implementing simple computer system and its operations.
5	To summarize the impact of computer systems on the development of economic and society.
6	To show the liability and professionalism when using computer systems.
7	To illustrate the ability for engaging in lifetime learning necessary for staying at the forefront of computing systems development.
8	To prepare small group oral presentations about new trends in computer systems.

Mapping course LOs to the SLO.

Course LOs #	Student Learning Outcomes											
	a1	a2	b1	b2	b3	b4	b5	c1	c2	c3	d1	d2
1	√											
2		√										
3			√									
4				√								
5						√						
6									√			
7										√		
8												√

List of Theory Topics

Fundamentals of Computer Organization: Organization and Architecture, Structure and Function, Functional Units, Basic Operational Concepts, Interconnection structure (Two different architectures), Bus Structures.

Data representations in Computer Systems: Data types, Number systems, Integers Representations, Integer Arithmetic, Fixed-point representations, Floating-point representations, Alphanumeric Representations (character codes), error detection codes.

Central Processing Unit: Processor structure and function, Arithmetic and logic Unit, Registers and Memory, Stack organization, Timing and Control, Instruction Cycle, Control unit operation, Micro Operations, Performance of CPU.

Memory System: Computer memory system overview, Types of memory, hierarchical memory systems, Cache memory, Memory Management Hardware.

Input /Output Organization: Peripherals Devices, I/O Interfaces, Types of data transfer, Modes of transfer, DMA, Serial communication.

List of Lab Experiments

1. Introduction to FPGA, Quartus and Verilog
2. Switches and Multiplexer
3. Latches, Flip-Flops and Registers
4. Circuit for *Master – Slave D Flip – Flop*
5. Design Counter Cicuits
6. Implementing 7 Segment Decoder
7. Implementing 4 Bit Ripple Carry Adder
8. Memory Blocks
9. RAM using 7 Segment Display
10. Simple Processor