

	ITER, SIKSHA ‘O’ ANUSANDHAN (Deemed to be University)		LESSON PLAN
Programme	B.Tech.	Academic Year	2023-24
Department	CSE/CSIT	Semester	4 <sup>th</sup>
Credit	4	Grading Pattern	1
Subject Code	EET 2211		
Subject Name	Computer Organization and Architecture		
Weekly Course Format	3L - 2P		
Instructor	Dr. Manoj Kumar Naik, Dr. Sunita Samant & Dr. Monalisa Mohanty		
Text Books(s): (1) Computer Organisation and Architecture by Willium Stallings, Pearson.(10 <sup>th</sup> edition)			
Course Outcomes	Students will be able to		
	CO1	Able to explain the concepts that underline the modern computers evolution, function, and organization.	
	CO2	Able to identify the appropriate organization of a computer for achieving the best performance.	
	CO3	Able to analyse and demonstrate the computer function and interconnection.	
	CO4	Able to understand and analyse the computer memory system.	
	CO5	Able to understand and analyse computer arithmetic via digital logic.	
	CO6	Able to interpret low level processor operations using a series of computer instructions.	

Sl.No.	Lessons/Topics to be covered	Book Reference (sections)	Mapping with COs	Home Work/ Assignments/ Quizzes
1	Organization and Architecture.	WS_1.1 (pg.26-27)	CO1	
2	Structure and Function.	WS_1.2 (pg.27-35)	CO1	
3	Embedded Systems and Cloud Computing.	WS_1.5 & WS_1.7 (pg.53-57 & pg. 63-66)	CO1	
4	<b>Lab#0:</b> Introduction to 8086 microprocessor - Architecture (Execution unit, Bus interface unit, Register organization) and Evolution of x86 processor.		CO1	
5	Designing for Performance Multicore, MICs, and GPG- PUs.	WS_2.1-2.2 (pg.69-77)	CO2	
6	Two Laws that Provide Insight: Amdahl's Law and Little's Law.	WS_2.3 (pg.77-80)	CO2	
7	Basic Measures of Computer Performance.	WS_2.4 (pg.80-83)	CO2	
8	<b>Lab#1:</b> Analyze the Arithmetic and logical operations using different Addressing Modes of the 8086 Microprocessor		CO6	
9	Calculating the Mean.	WS_2.5 (pg.83-91)	CO2	
10	Calculating the Mean.	WS_2.5 (pg.83-91)	CO2	<b>Assignment-1</b> (Basic concepts and computer evolution, Performance issues)
11	Computer components & Computer Function (Instruction fetch and Execute).	WS_3.1-3.2 (pg.105-113)	CO3	<b>Quiz-1</b>
12	<b>Lab#2:</b> Analyze and Evaluate the Branching operation in the 8086 Microprocessor.		CO6	

Sl.No.	Lessons/Topics to be covered	Book Reference (sections)	Mapping with COs	Home Work/ Assignments/ Quizzes
13	Computer Function (Interrupts) and I/O function.	WS_3.2 (pg.113-123)	CO3	
14	Interconnection Structures. Bus Interconnection.	WS_3.3-3.4 (pg.123-126)	CO3	
15	Computer Memory System Overview.	WS_4.1 (pg.145-151)	CO4	
16	<b>Lab#3:</b> Analyze and Evaluate the Array Operations using 8086 microprocessors.		CO6	
17	Cache Memory Principles.	WS_4.2 (pg.152-155)	CO4	
18	Elements of Cache Design (Direct mapping).	WS_4.3 (pg.155-162)	CO4	
19	Elements of Cache Design (Associative and set-associative mapping).	LU_4.3 (pg.162-168)	CO4	
20	<b>Lab#4:</b> Evaluate Different Arithmetic Operations and Logical operations on two 32-bit data using ARM processor		CO6	<b>Assignment-2 (A Top-Level View of Computer Function and Interconnection, Cache Memory)</b>
21	Semiconductor Main Memory (DRAM,SRAM and Types of ROM)	WS_5.1 (pg.190-194)	CO4	<b>Quiz-2</b>
22	Error Correction.	WS_5.2 (pg.198-204)	CO4	

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23	Error Correction.	WS_5.2 (pg.198-204)	CO4	
24	<b>Lab#5:</b> Analyze and evaluate different Array operations using ARM processor.		CO6	
25	RAID	WS_6.2 (pg.228-236)	CO4	
26	RAID	WS_6.2 (pg.228-236)	CO4	
27	External devices (Classification) and I/O modules (Module function, I/O module structure).	WS_7.1-7.2 (pg.254-259)	CO1	
28	<b>Lab#6:</b> Interfacing Seven Segment Display with 8086 processor.		CO6	Minor Project
29	Programmed I/O (8255)	WS_7.3 (pg.259-262, & pg. 269-272)	CO1	
30	Interrupt-Driven I/O (82C59A)	WS_7.4-7.5 (pg.263-268)	CO1	
31	Direct memory access (8237A)	WS_7.5 (pg.272-277)	CO2	Assignment-3 (Internal and External Memory, Input/Output)  Quiz-3
32	<b>Lab#7:</b> Interfacing stepper motor with ARM7 processor.		CO6	

Sl.No.	Lessons/Topics to be covered	Book Reference (sections)	Mapping with COs	Home Work/ Assignments/ Quizzes
33	Operating system overview.	WS_8.1 (pg.300-311)	CO2	
34	Scheduling	WS_8.2 (pg.311-317)	CO2	
35	INTEL x86 Memory management.	WS_8.4 (pg.328-333)	CO4	
36	<b>Lab#8:</b> Analyse and evaluate different string operations using 8086 microprocessor.		CO6	
37	ARM Memory management.	WS_8.5 (pg.333-338)	CO4	
38	Processor Organization.	WS_14.1 (pg.513-515)	CO1	
39	Instruction pipelining (Pipelining strategy)	WS_14.4 (pg.524-528)	CO1	
40	<b>Lab#9:</b> Analyse the use of stack and function of 8086 processor		CO6	
41	Instruction pipelining (Pipeline hazards)	WS_14.4 (pg.531-539)	CO1	
42	RISC	WS_15.4 (pg.573-579)	CO1	Quiz 4

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43	RISC Pipelining.	WS_15.5 (pg.579-583)	CO1	Assignment-4 (Operating System Support, Processor Structure and Function, Reduced Instruction Set Computers)
44	<b>Lab#10:</b> Analyse and evaluate different string operations using ARM processor.		CO6	
45	Integer Arithmetic (Addition, Subtraction, Multiplication(Booth's Algorithm) and Division	WS_10.3 (pg.359-374)	CO5	
46	Integer Arithmetic (Addition, Subtraction, Multiplication(Booth's Algorithm) and Division	WS_10.3 (pg.359-374)	CO5	Assignment-5 (Major topic- Number system, Computer arithmetic and Digital logic)
47	IEEE standards for Floating point representation	WS_10.4 (pg.374-382)	CO1	
48	<b>Lab#11:</b> Analyse the use of stack and function of ARM processor		CO6	

#### ✧ Minor Projects:

1. Design of a 16-bit Calculator (Arithmetic, Logical and Number system conversion) using 8086 Assembly language.
2. Design of a Traffic light controller using 8086 Assembly language.
3. Design of a Statistical calculator using 8086 Assembly language.
4. Design of a Matrix calculator using 8086 Assembly language.
5. Design of an Electronic dice using 8086 Assembly language.

6. Design of a system that searches a pattern in a string using 8086 Assembly language.
7. Design of a Digital clock using 8086 Assembly language.
8. Design any 8086-based game system.
9. Design a Scientific calculator using ARM32 Assembly language.
10. Design a Unit Converter using ARM32 Assembly language.
11. Design a Matrix calculator using ARM32 Assembly language.
12. Design a Statistical calculator using ARM32 Assembly language.
13. Design of an 8-bit ALU using VHDL programming language.
14. Design of Booth multiplier using VHDL programming language.