

LESSON PLAN 2025-26 (SUMMER)

NAME OF THE TEACHER : ABHISEK MISHRA , LECT. (STAGE-I, ETC)

SUBJECT : MICROPROCESSOR AND MICROCONTROLLER (Course Code: CSEPE 202A/ TH4A)

PROGRAM : DIPLOMA IN COMPUTER SCIENCE AND ENGINEERING

SEMESTER : 4TH

TOTAL CONTACT HOURS : 45

TOTAL MARKS: 100

ASSESSMENT : INTERNAL ASSESSMENT – 30, END TERM-70

AFTER THE COMPLETION OF THE COURSE, THE STUDENTS WILL BE ABLE TO:

- **CO1:** Describe the architectural differences between 8-bit and 16-bit microprocessors and microcontrollers.
- **CO2:** Develop efficient **Assembly Language Programs** for mathematical operations and data processing.
- **CO3:** Design interfacing circuits for **Memory and I/O devices** using address decoding techniques.
- **CO4:** Configure and program peripheral chips (8255, 8253, 8259) for system-level integration.
- **CO5:** Create microcontroller-based solutions for real-world applications like motor control and sensor data acquisition.

Lesson	Unit	Topic	Learning Objectives	Activity	Homework	COURSE OBJECTIVES
1	I	Intro & Evolution	Trace the history from 4004 to modern i9.	Timeline mapping on whiteboard.	List 5 modern CPU specs.	CO1
2	I	Specific Features	Understand RISC vs CISC and clock speed.	Compare 8-bit vs 64-bit systems.	Research Moore's Law.	CO1
3	I	Daily Life Apps	Identify CPUs in IoT, cars, and appliances.	"Hunt the Processor" quiz.	Find 3 non-PC CPU uses.	CO1
4	II	Internal Architecture	Understand ALU, CU, and Registers.		Draw the 8085 block diagram.	CO2
5	II	Bus Structure	Differentiate Address, Data, & Control buses.	Calculation of memory limits.	Explain bus multiplexing.	CO2
6	II	Reg-to-Reg Transfer	Understand internal data flow and timing.	Logic gate simulation of transfer.	Define "Tri-state" logic.	CO2
7	II	8085 Pinout	Learn physical interface of 8085 CPU.		Memorize power/clock pins.	CO2
8	II	8086/88 Pinout	Compare 8-bit (8085) vs 16-bit (8086).	Chart comparison of pins.	Explain MIN/MAX mode.	CO2
9	II	I/O Communication	Learn how CPUs "talk" to peripherals.	Diagramming handshake process.	Define Latches/ Buffers.	CO2
10	III	Addressing Modes	Learn how operands are specified.	Matching instructions to modes.	List 5 8085	CO3

					address modes.	
11	III	Instruction Cycles	Understand Fetch, Decode, Execute phases.	Flowcharting an instruction.	Define Machine Cycle.	CO3
12	III	Timing Diagrams	Visualize T-states and bus timing.		Draw a Memory Read cycle.	CO3
13	III	Assemblers/Compilers	Difference between Low & High level code.	"Human Compiler" logic game.	Write 3 pros of Assembly.	CO3
14	IV	Address Space	Learn memory map & linear addressing.	Calculating hex address ranges.	Design a 2KB memory map.	CO4
15	IV	Bus Demultiplexing	Using ALE to separate Address and Data.	Circuit simulation of ALE latch.	Why do we multiplex?	CO4
16	IV	Decoding & Buffering	Learn to select chips using decoders.	Design a 3-to-8 line decoder.	Study 74LS138 datasheet.	CO4
17	IV	Memory Mapped I/O	Compare Memory Mapped vs I/O Mapped.	T-chart comparison exercise.	List pros/cons of each.	CO4
18	IV	Interrupts Intro	Learn Hardware vs Software interrupts.	Roleplay: CPU vs Peripheral.	Define ISR routine.	CO4
19	IV	Transfer Schemes	Sync vs Async data transfer schemes.	Timing diagram comparison.	Explain "Strobe" control.	CO4
20	V	Assembly Basics	Register to Register & Memory transfers.	Writing "MOV" and "MVI" code.	Write code to move	CO5

					05H to B.	
21	V	Block Movement	Moving arrays of data in memory.	Writing a loop with "INX"/"DCR".	Trace a block move of 10B.	CO5
22	V	Data Merging	Combining two memory blocks.	Coding a merge logic flow.	Flowchart for merging.	CO5
23	V	Arithmetic: Add/Sub	8-bit addition/subtraction with flags.	Hand-calculating Carry/Zero.	Write code for 16-bit add.	CO5
24	V	Arithmetic: Mul/Div	Multiplication via repeated addition.	Logic building for division.	Write a multiplication loop.	CO5
25	V	Searching	Finding a byte in a memory block.	Live coding: Search for "00H".	Flowchart for linear search.	CO5
26	V	Sorting	Arranging data in ascending order.	Simulation of Bubble Sort.	Trace a 5-element sort.	CO5
27	V	Look-up Tables	Using tables for code conversion.	Constructing a square-root table.	Write a BCD to 7-seg code.	CO5
28	V	Subroutines/Stacks	Use of CALL, RET, and Stack Pointer.	Tracking SP during a call.	Explain PUSH and POP.	CO5
29	V	Delay Programs	Calculating time delays using loops.	Calculate delay for 2MHz clock.	Write a 1ms delay loop.	CO5

30	VI	PPI 8255	Functional description of 8255 chip.		Study Mode 0, 1, and 2.	CO6
31	VI	Timer 8253/54	Learning interval timers and counters.	Calculating frequency outputs.	List 6 modes of 8253.	CO6
32	VI	USART 8251	Serial communication basics (RS232).	Diagramming TX/RX data flow.	Define Baud Rate.	CO6
33	VI	DMA 8257/37	Direct Memory Access concepts.	Comparing CPU vs DMA transfer.	Explain "Cycle Stealing"	CO6
34	VI	PIC 8259	Managing multiple hardware interrupts.	Priority resolving logic game.	Define Cascading in 8259.	CO6
35	VI	Interfacing Lab	Interfacing a peripheral chip with CPU.	Wiring 8255 to LEDs (Sim).	Write a 8255 Init program.	CO6
36	VII	Keyboard Interface	Matrix keyboard scanning techniques.	Decoding a 4x4 keypress.	Write a key-debounce code.	CO7
37	VII	Display Interface	Interfacing 7-Segment and Dot Matrix.		Code for displaying "HELP".	CO7
38	VII	A/D & D/A	Converting real-world signals to digital.	Calculating step size/resolution.	Define Successive Approx.	CO7
39	VII	Stepper Motor	Controlling motor steps and direction.	Pulse sequence generation.	Write code for 90° turn.	CO7
40	VIII	8051 Introduction	Intro to Microcontrollers vs MPU.		List 8051 key features.	CO8

41	VIII	8051 Hardware	Pin diagram and I/O ports of 8051.	Labeling P0, P1, P2, P3.	Explain Port 0 requirements.	CO8
42	VIII	8051 Instruction Set	MCS-51 specific instructions.	Comparing 8085 vs 8051 syntax.	Write 8051 "Hello World".	CO8
43	VIII	8051 Programming	Timers and Serial Port programming.	Coding a TMOD configuration.	Write a timer-start routine.	CO8
44	VIII	8051 Interfacing	Practical application in a circuit.	Schematic of a temp sensor.	Design a 8051-based alarm.	CO8
45	Review	Final Overview	Comprehensive recap of all 8 units.	Mock Quiz / Q&A session.	Complete Final Report.	

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22/12/25

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