ECE331: Microprocessor and Interface

Programme: B. Tech. (ECE)	Year: 3rd	Semester: I
Course : Core	Credits: 3	Hours: 40

Course Context and Overview (100 words):

The purpose of this course is to teach students the fundamentals of microprocessor and microcontroller systems. The student will be able to incorporate these concepts into their electronic designs for other courses where control can be achieved via a microprocessor/ controller implementation. Although assembly language programming is a large component of the course, this course is hardware-oriented. Students will comprehend the basic requirements and layout of microcomputer and applying those concepts to achieve a dedicated "embedded" controller as a component of a larger system. Much of the experiments will be using a laboratory trainers based on the instructor choice of 8085 processor and I/O devices like stepper motor, traffic light controller etc.

Prerequisites Courses: Nil

Course Outcomes(COs):

On completion of this course, the students will have the ability to:
CO1: Students should be able to solve basic binary math operations using the microprocessor.
CO2: Students should be able to demonstrate programming proficiency using the various addressing modes and data transfer instructions of the target microprocessor.
CO3: Students should be able to program using the capabilities of the stack, the program counter, and the status register and show how these are used to execute a machine code program.
CO4: Students should be able to apply knowledge of the microprocessor's internal registers and operations by use of a PC based microprocessor simulator and 8085 kit.
CO5: Students should be able to write assemble assembly language programs, assemble into machine a cross assembler utility and download and run their program on the training boards.
CO6: Students should be able to design electrical circuitry to the Microprocessor I/O ports in order to interface the processor to external devices.

Course Topics:

Topics	Lecture Hours	
UNIT - I **1. Topic** Introduction	2	
1.1 Microcomputer and microprocessor,	1	
1.2 Evolution of microprocessors, types of buses.	1	2
UNIT - II **2. Topic** Architecture of 8085 microprocessor	5	
2.1 Internal architecture of Intel' s 8085 Microprocessor and its functional blocks	1	

2.2 Types of registers and their functions	1	5	
2.3 IC pin outs and signals	1		
2.3 Address, data and control buses, addressing,	1		
2.4 Opcode Fetch and execution procedure	1		
	3		
UNIT - III **3. Topic** Addressing Modes	3	3	
3.1 Register addressing mode, direct addressing mode	1		
3.2 Indirect addressing mode, Implicit addressing mode.	1		
3.3 Base, Base Index, Relative and Stack addressing modes	1		
UNIT - IV **4. Topic** Instruction Set of 8085 and its assembly Language programming	6	6	
4.1 Data Transfer Instructions, Arithmetic and Logical Instructions	3		
4.2 Branching Instructions and Stack Instructions	3		
UNIT-V **5. Topic** Timing diagrams	6	6	
5.1 Clock signals, instruction cycles, machine cycles	2		
5.2 Timing states, instruction timing diagrams and state transition diagram	4		
UNIT - VI **6. Topic** Interrupts	6		
6.1 Interrupts, Interrupt vector table,	3		
6.2 Branching Instructions and Stack Instructions	3		
UNIT - VII **7. Topic** Interfacing of Memory and I/O devices	6		
7.1 Importance of interfacing, type of memories	2		
7.2 SRAM architecture, Types of Incompatibiliy	2		
7.3 Memory mapped and Port mapped I/O, memory interfacing, I/O interfacing.	2		
UNIT - VI **8. Topic** Programmable Interfaces	8		
8.1 8255 PPI	2		
8.2 8259 PIC	2		
8.3 8253 PIT	2		
8.4 8279 KDI	2		

Text Books:
1. Microprocessor Architecture, Programming and Application with the 8085, Ramesh Gaonkar, Penram publication Pvt. Ltd., 2011.
2. Microprocessors and Interfacing, Douglas V. Hall, Tata McGraw Hill Publication.
3. Fundamentals of Microprocessors and Microcomputers, B. Ram, Dhanpat Rai Publications, NewDelhi.

Evaluation Methods:

Item	Weightage
Quiz 1	20

Quiz 2	
Quiz 3	
Quiz 4	
Assignment, Attendance and Performance	20
Mid-term Examination	20
End-term Examination	40