MICROPROCESSORS & MICROCONTROLLERS

Course Code	23CS4501C	Year	III	Semester	I
Course Category	Professional Elective-I	Branch	CSE	Course Type	Elective (Theory)
Credits	3	L – T – P	3-0-0	Prerequisites	DL&CO BEEE
Continuous Evaluation:	30	Semester End Evaluation:	70	Total Marks:	100

Course Outcomes		
Upon successful completion of the course, the student will be able to:		
CO1	**Understand** the architecture, functioning, and operational modes of the 8086 microprocessor and 8051 microcontroller, including instruction sets, addressing modes, and interrupt mechanisms.	L2
CO2	**Apply** assembly language programming techniques to develop and simulate programs for 8086 and 8051 using appropriate tools and directives.	L3
CO3	**Analyze** various interfacing techniques for memory and I/O devices such as LEDs, switches, ADC, DAC, and stepper motors with 8086 and 8051, including peripheral controllers like 8255, 8251, 8237a, and 8259.	L4
CO4	**Apply and Analyze** real-time applications of microcontrollers through timer programming, serial communication, and peripheral interfacing, and compare the features of Microprocessor, Microcontroller, PIC, and ARM processors.	L4

Syllabus

Unit No.	CONTENTS	Mapped CO
UNIT - I	**8086 Architecture**: Main features, pin diagram/description, 8086 microprocessor family, internal architecture, bus interfacing unit, execution unit, interrupts and interrupt response, 8086 system timing, minimum mode and maximum mode configuration.	CO1
UNIT - II	**8086 Programming**: Program development steps, instructions, addressing modes, assembler directives, writing simple programs with an assembler, assembly language program development tools.	CO2
UNIT - III	**8086 Interfacing**: Semiconductor memories interfacing (RAM, ROM), Intel 8255 programmable peripheral interface, Interfacing switches and LEDS, Interfacing seven segment displays, software and hardware interrupt applications, Intel 8251 USART architecture and interfacing, Intel 8237a DMA controller, stepper motor, A/D and D/A converters, Need for 8259 programmable interrupt controllers.	CO3

UNIT - IV	Microcontroller, Architecture of 8051, Special Function Registers(SFRs), I/O Pins Ports and Circuits, Instruction set, Addressing modes, Assembly language programming.	**CO1,CO2**
UNIT - V	Interfacing Microcontroller, Programming 8051 Timers, Serial Port Programming, Interrupts Programming, LCD & Keyboard Interfacing, ADC, DAC & Sensor Interfacing, External Memory Interface, Stepper Motor and Waveform generation, Comparison of Microprocessor, Microcontroller, PIC and ARM processors	**CO3,CO4**

Learning Resources

Text Books

1. Microprocessors and Interfacing – Programming and Hardware by Douglas V Hall, SSSP Rao, Tata McGraw Hill Education Private Limited, 3rd Edition,1994.
2. K M Bhurchandi, A K Ray, Advanced Microprocessors and Peripherals, 3rd edition, McGraw Hill Education, 2017.
3. Raj Kamal, Microcontrollers: Architecture, Programming, Interfacing and System Design, 2nd edition, Pearson, 2012.

Reference Books

1. Ramesh S Gaonkar, Microprocessor Architecture Programming and Applications with the 8085, 6th edition, Penram International Publishing, 2013.
2. Kenneth J. Ayala, The 8051 Microcontroller, 3rd edition, Cengage Learning, 2004.