MICROPROCESSORS AND MICROCONTROLLERS

V Semester: EEE

Course Code	Category	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIA	SEE	Total
AECB24	CORE	2	1	-	3	30	70	100
Contact Classes: 30	Tutorial Classes: 15	Practical Classes: Nil				Total Classes: 45		

OBJECTIVES:

The students will try to learn:

I The architectures and operation of microprocessors and microcontrollers.

II The programming and interfacing of Intel microprocessors and microcontrollers to design processor and controller based circuits.

III The applications of microprocessors and microcontrollers in the field of Communications, Electronic measurement, Control systems, Consumer electronics industry and other real-time systems.

COURSE OUTCOMES:

After successful completion of the course, Students will be able to

CO 1 **Outline** the functional components of 8085, 8086 and 8051 microcomputers to study the functionality.

CO 2 **Illustrate** the organization of registers and memory in 8086 for programming and memory allocation within processor.

CO 3 **Explain** the instruction fetch-decode-execute cycle timing and internal operation.

CO 4 **Explain** various addressing modes and instruction set of target microprocessor and microcontroller useful for writing assembly language programs.

CO 5 **Distinguish** between minimum mode and maximum mode operation of 8086 microprocessor with timing diagrams.

CO 6 **Illustrate** the functionality of various types of interrupts and their structure for controlling the processor or controller and program execution flow using Programmable interrupt controller.

CO 7 **Develop** address decoding schemes for the microprocessor/ microcontroller memory map using memory modules and logic components like decoder and tri-state buffers.

CO 8 **Demonstrate** the internal architecture and various modes of operation of the devices used for interfacing memory and I/O devices with microprocessor.

CO 9 **Choose** an appropriate data transfer scheme and hardware to perform serial data transfer among the devices.

CO 10 **Build** input –output systems utilizing general purpose I/O, internal building blocks and registers of 8051 microcontroller to perform serial data transfer, timer operation, interfacing of memory and I/O devices.

CO 11 **Develop** microprocessor/microcontroller applications alone or as a member in a team by using necessary peripherals like ADC/DAC.

MODULE -I	8086 MICROPROCESSORS	Classes : 08

Register organization of 8086, Architecture, signal description of 8086, physical memory organization, general bus operation, I/O addressing capability, special purpose activities, Minimum mode, maximum mode of 8086 system and timings, machine language instruction formats, addressing mode of 8086, instruction set off 8086, assembler directives and operators.

MODULE -II	PROGRAMMING WITH 8086 MICROPROCESSOR	Classes : 09
Machine level programs, programming with an assembler, Assembly language programs, introduction to stack, stack structure of 8086/8088, interrupts and interrupt service routines. Interrupt cycle of 8086, non-mask able interrupt and mask able interrupts, interrupt programming.		
MODULE -III	**INTERFACING WITH 8086/88**	**Classes: 08**
Semiconductor memory interfacing, dynamic RAM interfacing, interfacing i/o ports, PIO 8255 modes of operation of 8255, interfacing to D/A and A/D converters, stepper motor interfacing, control of high power devices using 8255. Programmable interrupt controller 8259A, the keyboard /display controller8279, programmable communication interface 8251 USART, DMA Controller 8257.		
MODULE -IV	**8051 MICROCONTROLLER**	**Classes: 10**
8051 Microcontroller – Internal architecture and pin configuration, 8051 addressing modes, instruction set, Bit addressable features. I/O Port structures, assembly language programming using data transfer, arithmetic, logical and branch instructions.		
MODULE -V	**SYSTEM DESIGN USING MICROCONTROLLER**	**Classes : 10**
8051 Timers/Counters, Serial data communication and its programming, 8051 interrupts, Interrupt vector table, Interrupt programming. Real world interfacing of 8051 with external memory, expansion of I/O ports, LCD, ADC, DAC, stepper motor interfacing.		

Text Books:

1. Ray A.K, Bhurchandi K.M, "Advanced Microprocessor and Peripherals", TMH, 2nd Edition, 2012
2. Muhammad Ali Mazidi, J.G. Mazidi, R.D McKinlay," The 8051 Microcontroller and Embedded systems using Assembly and C", Pearson education, 2nd Edition, 2009.
3. Douglas V. Hall, "Microprocessors and Interfacing Programming and Hardware", TMGH,2nd Edition, 1994.

Reference Books:

1. Kenneth J. Ayala, "The 8051 Microcontroller", Thomson Learning, 3rd edition, 2005.
2. Manish K. Patel, "The 8051 Microcontroller Based Embedded Systems", McGraw Hill, 1st Edition, 2014.

Web References:

1. http://www.nptel.ac.in/downloads/106108100/
2. http://www.the8051microcontroller.com/web-references
3. http://www.iare.ac.in

E-Text Books:

1. https://books.google.co.in/books
2. http://www.www.jntubook.com
3. http://www.ebooklibrary.org/articles/mpmc