MICROPROCESSORS AND MICROCONTROLLERS

VI Semester: ECE

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	Signal descriptions with functional architecture and hardware interfacing skills with microprocessors and microcontrollers.
II	The instruction set and logic to build assembly language programs for automated electronic systems
III	The essential concepts of development through a practical, hands-on approach on advanced processors such as ARM processors and Internet of Things based systems.

COURSE OUTCOMES:

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

CO 1	**Describe** the features of Intel processors and microcontrollers for signal description **and** architecture.
CO 2	Illustrate instruction set for efficient assembly language level programming.
CO 3	**Construct the** maximum and stand-alone modes of operation using circuit schematic & timing diagrams.
CO 4	**Select** appropriate address mapping and hardware design for volatile and non-volatile memories.
CO 5	**Illustrate** interfacing devices with microprocessor and microcontroller using Programmable Peripheral Interface (PPI) and Interrupt Controllers.
CO 6	**Outline** the working of stepper motor for required number of rotations clockwise & anticlockwise.
CO 7	**Analyse** the benefits of direct memory access using DMA controllers with necessary hardware and software.
CO 8	**Compare** synchronous & asynchronous communication schemes using appropriate resources of microprocessor and microcontrollers
CO 9	Outline minimization of hardware while using internal resources of Micro controller.
CO 10	**Describe** key de-bouncing to take care of fluctuations while using keyboard- display units.
CO 11	**Build** prototype models and products subsequently in embedded field for real life needs and applications.

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