# MICROPROCESSORS AND MICROCONTROLLERS

VI Semester: ECE   V Semester: EEE									
<b>Course Code</b>	Category	Hours / Week			Credits	Maximum Marks			
AECB24	Core	L	Т	Р	С	CIA	SEE	Total	
		2	1	-	3	30	70	100	
Contact Classes: 30	Tutorial Classes: 15	Practical Classes: Nil			ses: Nil	Total Classes: 45			
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Processor and controller cores are the key components in most of the modern embedded and system-on-chip designs. This course outlines the architecture and signal description of Intel microprocessor and microcontrollers. The instruction set and assembly language programming along with I/O and memory interfacing techniques are covered. The knowledge acquired from this course will enable the students in development of embedded hardware projects and models for engineering and scientific applications.

# **II. OBJECTIVES:**

## The course should enable the students to:

- I The signal descriptions along with functional architecture and hardware interfacing skills using microprocessors and micro controllers.
- **II** The instruction set and logic to build assembly language programs for arithmetic, logic and automated electronic systems.
- **III** The essential concepts of development through a practical hands-on approach on advanced ARM processors and Internet of Things based systems.

## **III. COURSE OUTCOMES:**

#### After successful completion of the course, students should be able to:

- CO 1 **Describe** the features of intel processors and micro controllers forsignal description Understand and architecture.
- CO 2 Make use of addressing modes and instruction set of target microprocessors and micro Apply controllers for writing efficient assemblylanguage programs.
- CO 3 **Demonstrate** the internal architecture and modes of operation of peripheral devices Understand for interfacing memory and I/O devices.
- CO 4 **Illustrate** the interrupt handling mechanism in microprocessors and micro Understand controllers using interrupt controller.
- CO 5 **Choose** an appropriate data transfer scheme and hardware for data transfer between Apply the devices.
- CO 6 **Develop** microprocessor and micro controller based applications using appropriate Apply input and output devices.

# **IV. SYLLABUS:**

# 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
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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:** Ray A.K, Bhurchandi K.M, "Advanced Microprocessor and Peripherals", TMH, 2nd Edition, 2012 1. 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. Douglas V. Hall, "Microprocessors and Interfacing Programming and Hardware", TMGH, 3. 4. 2nd Edition, 1994. **Reference Books** Kenneth J. Avala, "The 8051 Microcontroller", Thomson Learning, 3rd edition, 2005. 1. Manish K. Patel, "The 8051 Microcontroller Based Embedded Systems", McGraw Hill, 1st Edition, 2014. 2. Ajay V Deshmukh, "Microcontrollers", TATA McGraw Hill publications, 2nd Edition, 2012. 3. 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 Book:

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