

## MICROPROCESSORS AND MICROCONTROLLERS

<b>VI Semester: ECE</b>								
Course Code	Category	Hours / Week			Credits	Maximum Marks		
AEC013	Core	L	T	P	C	CIA	SEE	Total
		3	1	-	4	30	70	100
<b>Contact Classes: 45</b>		<b>Tutorial Classes: 15</b>		<b>Practical Classes: Nil</b>		<b>Total Classes: 60</b>		
<p><b>I. COURSE OVERVIEW:</b>            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.</p> <p><b>II. OBJECTIVES:</b>  <b>The course should enable the students to:</b></p> <p>I The signal descriptions along with functional architecture and hardware interfacing skills using microprocessors and microcontrollers.</p> <p>II The instruction set and logic to build assembly language programs for arithmetic, logic and automated electronic systems.</p> <p>III The essential concepts of development through a practical hands-on approach on advanced ARM processors and Internet of Things based systems.</p> <p><b>III. COURSE OUTCOMES:</b>  <b>After successful completion of the course, students should be able to:</b></p> <p>CO 1 <b>Outline</b> the functional components of microprocessors and microcontrollers for understanding the operation of architectures. Understand</p> <p>CO 2 <b>Make use of</b> addressing modes and instruction set of target microprocessors and microcontrollers for writing an assembly language programs to perform a task. Apply</p> <p>CO 3 <b>Demonstrate</b> the internal architecture and modes of operation of peripheral devices for interfacing memory and I/O devices. Understand</p> <p>CO 4 <b>Illustrate</b> the interrupt handling mechanism in microprocessors and microcontrollers using interrupt controller. Understand</p> <p>CO 5 <b>Choose</b> an appropriate data transfer scheme and hardware for data transfer between the devices. Apply</p> <p>CO 6 <b>Develop</b> microprocessor and microcontroller based applications using necessary input and output devices. Apply</p>								
<b>IV. SYLLABUS:</b>								
<b>UNIT-I</b>	<b>8086 MICROPROCESSORS</b>						<b>Classes: 10</b>	
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.								
<b>UNIT-II</b>	<b>PROGRAMMING WITH 8086 MICROPROCESSOR</b>						<b>Classes: 08</b>	
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.								
<b>UNIT-III</b>	<b>INTERFACING WITH 8086/88</b>						<b>Classes: 08</b>	

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 controller 8279, programmable communication interface 8251 USART, DMA Controller 8257.

<b>UNIT-IV</b>	<b>8051 MICROCONTROLLER</b>	<b>Classes: 09</b>
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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.

<b>UNIT-V</b>	<b>SYSTEM DESIGN USING MICROCONTROLLER</b>	<b>Classes: 10</b>
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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, 2<sup>nd</sup> Edition, 2012
2. Muhammad Ali Mazidi, J.G. Mazidi, R.D McKinlay,” The 8051 Microcontroller and Embedded systems using Assembly and C”, Pearson education, 2<sup>nd</sup> Edition, 2009.
3. Douglas V. Hall, “Microprocessors and Interfacing Programming and Hardware”, TMGH, 2<sup>nd</sup> Edition, 1994.

**Reference Books:**

1. Kenneth J. Ayala, “The 8051 Microcontroller”, Thomson Learning, 3<sup>rd</sup> edition, 2005.
2. Manish K. Patel, “The 8051 Microcontroller Based Embedded Systems”, McGraw Hill, 1<sup>st</sup> Edition, 2014.
3. Ajay V Deshmukh, ”Microcontrollers”, TATA McGraw Hill publications, 2<sup>nd</sup> Edition, 2012.

**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>

**Course Home Page:**