

## 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: 48</b>		<b>Tutorial Classes: 10</b>		<b>Practical Classes: Nil</b>			<b>Total Classes: 58</b>	
<b>OBJECTIVES:</b>								
<b>The course should enable the students to:</b>								
<ol style="list-style-type: none"> <li>I. Imbibe sound knowledge about architecture, instruction set and concepts of 8086 and 8051</li> <li>II. Demonstrate the ability to develop programmers for different applications using assembly language of 8086 and 8051.</li> <li>III. Impart knowledge of different types of external peripherals like 8255, 8259, 8279, 8251, 8257.</li> <li>IV. Be proficient in Memory and I/O interfacing with 8086 and 8051.</li> </ol>								
<b>COURSE OUTCOMES (COs):</b>								
<p><b>CO 1</b> Acquire knowledge about architecture and functional features of microprocessors particularly 8086</p> <p><b>CO 2</b> Obtain an insight in to the instruction set of 8086 and write programs in assembly level language</p> <p><b>CO 3</b> Interface different types of external peripherals like 8255, 8259, 8279, 8251 &amp; 8257 with 8086</p> <p><b>CO 4</b> Imbibe knowledge about hardware details of 8051 microcontrollers and develop assembly language programs for data transfer, arithmetic, logical and branch instructions.</p> <p><b>CO 5</b> Design simple systems using timers, interrupts, memories ADC and DACs etc. using 8051.</p>								
<b>COURSE LEARNING OUTCOMES (CLOs):</b>								
<ol style="list-style-type: none"> <li>1. Understand the internal Architecture and different Modes of operation of popular 8086 microprocessors</li> <li>2. Basic understanding of 8085 and 8086 microprocessors architectures and its functionalities.</li> <li>3. An ability to distinguish between RISC and CISC based microprocessors.</li> <li>4. Understand the importance of addressing modes and the instruction set of the processor which is used for programming.</li> <li>5. Understand and apply the fundamentals of assembly level programming of microprocessors.</li> <li>6. Design and develop 8086 Microprocessor based systems for real time applications using low level language like ALP.</li> <li>7. Ability to interface the external peripherals and I/O devices and program the 8086 microprocessor using 8255.</li> <li>8. Understand the memory organization and interrupts of processors helps in various system designing aspects.</li> <li>9. Identify the significance of serial communication in 8086 with required baud rate</li> <li>10. An ability to distinguish between the serial and parallel data transfer schemes.</li> <li>11. Identify the significance of interrupts and interrupt service routines with appropriate illustrations.</li> <li>12. Develop the interfacing of universal synchronous asynchronous receiver transmitter 8251 with 8086 processor</li> <li>13. Ability to interface the programmable interrupt controller 8259 with 8086.</li> <li>14. Understand the internal Architecture and different modes of operation of popular 8051 microcontrollers.</li> <li>15. Basic understanding of 8051 microcontrollers functionalities.</li> <li>16. Understand the different addressing modes used in assembly language programming of microcontrollers.</li> <li>17. Write programs for arithmetic and logical computations using 8051 instruction sets.</li> <li>18. Construct, and develop of required delay circuits using timers of 8051 in the laboratory.</li> <li>19. Interfacing of physical elements using Digital and analog converters with microcontrollers.</li> <li>20. Assess and interface required memory to microcontrollers with appropriate memory mapping.</li> <li>21. Apply concept of microprocessors and microcontrollers to understand and analyze real time applications.</li> <li>22. Acquire the knowledge and develop capability to succeed national and international level competitive examinations.</li> </ol>								

<b>Unit-I</b>	<b>8086 MICROPROCESSORS</b>	<b>Classes: 11</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 of 8086, assembler directives and operators.		
<b>Unit-II</b>	<b>PROGRAMMING WITH 8086 MICROPROCESSOR</b>	<b>Classes: 09</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: 10</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>
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: 09</b>
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.		
<b>Text Books:</b>		
<ol style="list-style-type: none"> <li>1. D. V. Hall, “Microprocessors and Interfacing”, Tata McGraw-Hill Education, 3<sup>rd</sup> Edition 2013.</li> <li>2. A.K Ray, K. M. Bhurchandani, “Advanced Microprocessors and Peripherals” Tata McGraw-Hill Education, 2<sup>nd</sup> Edition, 2006.</li> <li>3. Savaliya M. T, “8086 Programming and Advance Processor Architecture”, Wiley India Pvt., 1<sup>st</sup> Edition, 2012.</li> </ol>		
<b>Reference Books:</b>		
<ol style="list-style-type: none"> <li>1. N. Senthil Kumar, M. Saravanan, S. Jeevanathan, S. K. Shah, “Microprocessors and Interfacing”, Oxford University, 1<sup>st</sup> Edition, 2012.</li> <li>2. Lyla B. Das, “The x86 Microprocessors”, Pearson India, 2<sup>nd</sup> Edition, 2014.</li> </ol>		
<b>Web References:</b>		
<ol style="list-style-type: none"> <li>1. <a href="http://www.daenotes.com/electronics/digital-electronics/Intel-80858bitmicroprocessor#axzz2I9yUSe7I">http://www.daenotes.com/electronics/digital-electronics/Intel-80858bitmicroprocessor#axzz2I9yUSe7I</a></li> <li>2. <a href="https://www.smartzworld.com/notes/microprocessors-and-microcontrollers-mpmc/">https://www.smartzworld.com/notes/microprocessors-and-microcontrollers-mpmc/</a></li> <li>3. <a href="http://www.iare.ac.in">http://www.iare.ac.in</a></li> </ol>		
<b>E-Text Books:</b>		
<ol style="list-style-type: none"> <li>1. <a href="http://engineersevanigam.blogspot.in/2013/07/microprocessors-and-interfacing-by.html">http://engineersevanigam.blogspot.in/2013/07/microprocessors-and-interfacing-by.html</a></li> <li>2. <a href="https://www.scribd.com/doc/153593067/Microprocessor-by-A-P-Godse-D-A-Godse">https://www.scribd.com/doc/153593067/Microprocessor-by-A-P-Godse-D-A-Godse</a></li> </ol>		