

## MICROPROCESSORS INTERFACING AND APPLICATIONS

<b>VI Semester: IT</b>								
Course Code	Category	Hours / Week			Credits	Maximum Marks		
<b>AEC023</b>	<b>Core</b>	L	T	P	C	CIA	SEE	Total
		3	1	-	4	30	70	100
<b>Contact Classes: 50</b>	<b>Tutorial Classes: 10</b>	<b>Practical Classes: Nil</b>			<b>Total Classes: 60</b>			
<p><b>OBJECTIVES:</b>  <b>The course should enable the students to:</b></p> <ol style="list-style-type: none"> <li>I. Understand the concept of microprocessor and familiarize the architecture of 8085 and 8086 processor.</li> <li>II. Analyze the assembly language programming using 8086 microprocessor.</li> <li>III. Develop the knowledge of microprocessor based systems and interfacing techniques.</li> <li>IV. Understand the concept of Interrupts and their significance in 8086.</li> <li>V. Impart the basic concepts of serial and parallel bus standards.</li> <li>VI. Understand the basic concept of advanced processor architectures.</li> </ol> <p><b>COURSE OUTCOMES (COs):</b></p> <p>CO1. Describe the concepts of Architectures of 8085 and 8086 with its functionalities and understand the addressing modes and instructions sets of 8086.</p> <p>CO2. Describe Minimum mode and maximum mode of operation of 8086 and Analyze the Assembly language programs involving in various arithmetic and logical operations.</p> <p>CO3. Discuss the importance of 8255, 8257 and explain interfacing of I/O device with different modules.</p> <p>CO4. Analyze the various synchronous and asynchronous serial data transfer schemes in 8086 and importance of 8251</p> <p>CO5. Understand the advanced 16 and 32 bit microprocessors architectures and its features.</p> <p><b>COURSE LEARNING OUTCOMES (CLOs):</b></p> <ol style="list-style-type: none"> <li>1. Differentiate between 8085 and 8086 microprocessors architectures and its functionalities.</li> <li>2. Describe the internal Architecture of 8086 microprocessor and explain its functionalities.</li> <li>3. Describe in detail about functions of general purpose register and 8086 flag register with its functions.</li> <li>4. Explain various addressing modes and instruction set present in 8086 microprocessors and Describe in detail about the concept of interrupt, types of interrupts 8086 microprocessor.</li> <li>5. Understand and apply the fundamentals and procedures and assembler directives of assembly level programming of microprocessors.</li> <li>6. Develop low level languages like ALP in 8086 microprocessor systems for real time applications</li> <li>7. Describe Minimum mode and maximum mode of operation and timing diagram of 8086 microprocessor</li> <li>8. Explain various Assembly language programs involving logical, branch and call instructions.</li> <li>9. Evaluation of arithmetic expressions, string manipulation, sorting using various Assembly language programs.</li> <li>10. Identify the importance of various modes of 8255 operation and interfacing to 8086.</li> <li>11. Discuss the interfacing diagram of I/O devices with keyboard, stepper motor, 7-segment display, LCD and digital to analog and analog to digital converter.</li> <li>12. Explain in detail about the importance of DMA, interrupt and interrupt sub routines in 8086 microprocessor</li> <li>13. Analyze and understand various synchronous and asynchronous serial data transfer schemes in 8086.</li> <li>14. Develop and design the interfacing circuit diagram of 8251 USART with 8086 processor.</li> <li>15. Understand the high-speed serial communications standards, USB.</li> <li>16. Understand basic architecture of 16 bit and 32 bit microprocessors with the help of GDT, LDT and multitasking and addressing modes.</li> </ol>								

<p>17. Flag register 80386: Architecture, register organization, memory access in protected mode</p> <p>18. Analyze the various advanced microprocessors internal architectures for 80X86 by paging and technical features.</p>		
<b>Unit-I</b>	<b>OVERVIEW OF 8086 MICROPROCESSOR</b>	<b>Classes: 11</b>
<p>Introduction to 8085 microprocessor. RISC and CISC processors, architecture of 8086 microprocessor, special functions of general purpose register, 8086 flag register and function of 8086 flags, addressing modes of 8086, instruction set of 8086, assembler directives.</p>		
<b>Unit -II</b>	<b>8086 ASSEMBLY LANGUAGE PROGRAMMING</b>	<b>Classes: 10</b>
<p>Minimum mode and maximum mode of operation, timing diagram, Assembly language programs: Assembly language programs involving logical, branch and call instructions, sorting, evaluation of arithmetic expressions, string manipulation.</p>		
<b>Unit -III</b>	<b>8255 PROGRAMMABLE PERIPHERAL INTERFACE (PPI)</b>	<b>Classes: 10</b>
<p>Various modes of 8255 operation and interfacing to 8086; Interfacing keyboard, displays, 8279 Stepper motor and actuators, digital to analog and analog to digital converter interfacing.</p> <p>Interrupt structure of 8086: Interrupt structure of 8086, Vector interrupt table, interrupt service routines; Introduction to DOS and BIOS interrupts, need for DMA, DMA data transfer method, interfacing with 8237/8257.</p>		
<b>Unit –I V</b>	<b>SERIAL DATA TRANSFER SCHEMES</b>	<b>Classes: 10</b>
<p>Asynchronous and synchronous data transfer schemes, 8251 USART architecture and interfacing; TTL to RS 232C and RS232C to TTL conversion; Sample program of serial data transfer; Introduction to high-speed serial communications standards, USB.</p>		
<b>Unit -V</b>	<b>ADVANCED MICROPROCESSORS</b>	<b>Classes: 09</b>
<p>80286 microprocessor: Architecture, registers (Real/Protected mode), privilege levels, descriptor cache, memory access in GDT and LDT, multitasking, addressing modes; Flag register 80386: Architecture, register organization, memory access in protected mode, paging; 80486: Only the technical features.</p>		
<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> <li>3. Daniel Tabak, –Advanced Microprocessors, Addison-Wesley, 2<sup>nd</sup> Edition, 1996.</li> <li>4. Triebel, Singh, –The 8088 and 8086 Microprocessors, PHI, 4<sup>th</sup> Edition 2003.</li> </ol>		

**Web References:**

1. [http://www.daenotes.com/electronics/digital-electronics/Intel-8085-8-bitmicroprocessor#\\_axzz2I9yUSe7I](http://www.daenotes.com/electronics/digital-electronics/Intel-8085-8-bitmicroprocessor#_axzz2I9yUSe7I)
2. [http://www.alljntuworld.in/wp-content/uploads/2015/12/Microprocessors-and-Interfacing- Devices.pdf](http://www.alljntuworld.in/wp-content/uploads/2015/12/Microprocessors-and-Interfacing-Devices.pdf)
3. <https://www.smartzworld.com/notes/microprocessors-and-microcontrollers-mpmc/>

**E-Text Books:**

1. <http://www.freepdfbook.com/micro-processors-and-interfacing/>
2. <http://engineersevanigam.blogspot.in/2013/07/microprocessors-and-interfacing-by.html>
3. <https://www.scribd.com/doc/153593067/Microprocessor-by-A-P-Godse-D-A-Godse>

