# MICROPROCESSORS INTERFACING AND APPLICATIONS

**VI Semester: IT**

| Course Code | Category | Hours / Week | | | Credits | Maximum Marks | | |
|---|---|---|---|---|---|---|---|---|
| | | **L** | **T** | **P** | **C** | **CIA** | **SEE** | **Total** |
| AEC023 | **Core** | 3 | 1 | - | 4 | 30 | 70 | 100 |
| **Contact Classes: 48** | **Tutorial Classes: 10** | **Practical Classes: Nil** | | | | **Total Classes: 58** | | |

**OBJECTIVES:**

**The course should enable the students to:**

I. Understand the basic concepts of microprocessors and develop the architectures of 8085 and 8086.
II. Analyze and develop assembly language programming for 8086 microprocessor.
III. Develop various interfacing modules by using assembly language programming.
IV. Understand and know the basic concepts of advance micro processor architectures like 80386 and 80486.

**COURSE LEARNING OUTCOMES (CLOs):**

1. Understand the internal Architecture of 8086 microprocessor and explain various modes of operation of 8086.
2. Differentiate between 8085 and 8086 microprocessors architectures and its functionalities.
3. Distinguish between RISC and CISC architecture based microprocessors.
4. Explain various addressing modes and instruction set present in 8086 microprocessor.
5. Ability to understand and apply the fundamentals of assembly level programming of microprocessors.
6. Analyze and develop low level languages like ALP in 8086 Microprocessor systems for real time applications.
7. Describe in detail about the concept of interrupt, types of interrupts and ISR present in 8086 microprocessor.
8. Understand the concept of memory organization in processors which helps in various system designing aspects.
9. Identify the importance and significance of serial communication protocols in 8086 microprocessor..
10. Explain in detail about the importance of interrupt and interrupt sub routines in 8086 microprocessor.
11. Discuss the interfacing diagram of I/O devices with keyboard, 7-segment display, LCD and DAC to ADC.
12. Develop and design the interfacing circuit diagram of 8251 with 8086 processor.
13. Analyze and understand various synchronous and asynchronous serial data transfer schemes in 8086.
14. Explain the advance architectures of PIC and also the importance of interfacing a interrupt controller in PIC.
15. Understand basic architecture of 16 bit and 32 bit microprocessors with the help of multitasking and addressing modes.
16. Analyze the various advanced microprocessors internal architectures for 80X86 by paging and technical features.

| Unit-I | OVERVIEW OF 8086 MICROPROCESSOR | Classes: 11 |
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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.

| Unit -II | 8086 ASSEMBLY LANGUAGE PROGRAMMING | Classes: 09 |
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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.

| Unit -III | 8255 PROGRAMMABLE PERIPHERAL INTERFACE (PPI) | Classes: 10 |
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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.
Interrupt structure of 8086: Interrupt structure of 8086, Vector interrupt table, interrupt service routines; Introduction to DOS and BIOS interrupts, 8259 PIC architecture and interfacing cascading of interrupt controller and its importance.

| Unit -IV | SERIAL DATA TRANSFER SCHEMES | Classes: 09 |
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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.

| Unit -V | ADVANCED MICROPROCESSORS | Classes: 09 |
|---|---|---|

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.

## Text Books:

1. D. V. Hall, "Microprocessors and Interfacing", Tata McGraw-Hill Education, 3rd Edition 2013.
2. A.K Ray, K. M. Bhurchandani, "Advanced Microprocessors and Peripherals" Tata McGraw-Hill Education, 2nd Edition, 2006.
3. Savaliya M. T, "8086 Programming and Advance Processor Architecture", Wiley India Pvt., 1st Edition, 2012.

## Reference Books:

1. N. Senthil Kumar, M. Saravanan, S. Jeevanathan, S. K. Shah, "Microprocessors and Interfacing", Oxford University, 1st Edition, 2012.
2. Lyla B. Das, "The x86 Microprocessors", Pearson India, 2nd Edition, 2014.

## Web References:

1. http://www.daenotes.com/electronics/digital-electronics/Intel-80858bitmicroprocessor#axzz2I9yUSe7I
2. https://www.smartzworld.com/notes/microprocessors-and-microcontrollers-mpmc/
3. http://www.iare.ac.in

## E-Text Books:

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