2/4 B.Tech. SECOND SEMESTER
MICROPROCESSORS & INTERFACING

CS4T5   **Required**   **Credits: 4**

Lecture: 4 periods/week   **Internal assessment: 30 marks**

Tutorial: 1 period /week   **Semester end examination: 70 marks**

Course context and Overview: Microprocessor is a required course and the purpose of this course is to teach students the fundamentals of microprocessor and microcontroller systems. The student will be able to incorporate these concepts into their electronic designs for other courses where control can be achieved via a microprocessor/controller implementation. Topics include Semiconductor memory devices and systems, microcomputer architecture, assembly language programming, I/O programming, I/O interface design, I/O peripheral devices, data communications, and data acquisition systems. Several laboratory exercises will be based on both microprocessor (Intel 8086) and microcontroller (Intel 8051).

Prerequisites: Computer Organization and Logic Design

Objectives:
1. To develop an in-depth understanding of the operation of microprocessors and microcontrollers, and write assembly language programs
2. To be able to understand and implement microprocessor interfacing techniques
3. To be able to design and implement microprocessor-based systems in both hardware and software
4. To be able to apply this knowledge to more advanced structures

Learning Outcomes:
1. Describe the architecture 8086 microprocessor and its programming model.
2. Apply the programming techniques in developing the assembly language program for microprocessor application
3. Implement interfacing of peripheral devices with 8086 microprocessor
4. Distinguish among different advanced microprocessors.

UNIT I

An over view of 8085, Architecture of 8086 Microprocessor. Special functions of General purpose registers. 8086 flag register and function of 8086 Flags. Addressing modes of 8086. Instruction set of 8086. Assembler directives, simple programs, procedures, and macros.

UNIT II

Assembly language programs involving logical, Branch & Call instructions, sorting, evaluation of arithmetic expressions, string manipulation.

UNIT III

Pin diagram of 8086-Minimum mode and maximum mode of operation. Timing

diagram.Memory interfacing to 8086 (Static RAM & EPROM).Need for DMA. DMA data transfer Method. Interfacing with 8237/8257.

UNIT IV

8255 PPI – various modes of operation and interfacing to 8086.Interfacing Keyboard, Displays, 8279 Stepper Motor and actuators. D/A and A/D converter interfacing.

UNIT V

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 VI

Serial data transfer schemes. 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 VII: CPU: architecture of Intel 80286 CPU, Intel 80386, and 32-bit CPU- 80486-Microprocessor(No instruction set).

UNIT VIII: Introduction to Pentium Processor architecture, dual Core and Core Duo Basiccharacteristics, Architecture and comparison with other CPU's.

Learning resources

Text Books :

1. Micro Processors & Interfacing – Douglas U. Hall, 2007.
2. The X86 Microprocessors, architecture, Programming and Interfacing (8086 to Pentium), Lyla B Das, Pearson.

References:

1. Microprocessor Architecture, Programming, and Applications With the 8085 , Ramesh S Gaonkar,prentice hall 5e.
2. Micro Computer System 8086/8088 Family Architecture, Programming and Design - By Liu and GA Gibson, PHI, 2nd Ed.
3. The Intel Microprocessors by Barry B.Brey
4. The 8086 Microprocessor: Programming & Interfacing the PC, Ayala: Cengage