**3/4 B.Tech. SECOND SEMESTER**

**EE6T3 MICROCONTROLLERS AND APPLICATIONS Credits: 3**

**Lecture: 3 periods/week** **Internal assessment: 30 marks**
**Tutorial: 1 period /week** **Semester end examination: 70 marks**

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**Objective:**
Microprocessor and Microcontrollers have become important building blocks in digital electronic design. It is important to understand the architecture of microprocessors and its interfacing with various modules. 8086 microprocessor architecture, programming in detail in this course. Interfacing, assembly language programming and interfacing of 8051 microcontroller and its application in industry are also covered in this course.

**Learning Outcomes:**
1. Have a clear understanding of the architecture and instruction set of 8086 and 8051.
2. Be able to interface peripherals and memory with 8086 and 8051
3. Write assembly language programs to perform a given task.
4. Understand interrupt service routines for all interrupt types.
5. Write microcontroller programs and interface devices.

UNIT – I
INTEL8086
Introduction and evolution of Microprocessors, Architecture of 8086, Register Organization of 8086, Memory Organization of 8086, Pin diagram of 8086
Minimum and Maximum mode operations of 8086, General Bus Operation of 8086, Read and Write cycle timing diagram, Addressing Modes and Instruction set.

UNIT – II
ASSEMBLY LANGUAGE PROGRAMMING
Assembler Directives, Algorithms for implementation of FOR loop, WHILE, REPEAT and IF-THEN-ELSE features, Procedures and Macros, simple Assembly Language Programming.

UNIT – III
8051 Microcontrollers
Intel 8051 architecture, memory organization, flags, stack, and special function registers, I/O, ports - connecting external memory, counters and timers, serial data I/O, Interrupts.
Microcontroller instructions - addressing modes, moving data, logical operations, arithmetic operations, jump and call instructions –subroutines - Interrupts and returns.

UNIT – IV
ASSEMBLY LANGUAGE PROGRAMMING
Microcontroller programming - Assembly Language Programming, timer and counter programming, connection to RS 232 and RS 485, Interrupt programming

UNIT – V

PERIPHERALS AND INTERFACING

Serial and parallel I/O (8251 and 8255), Programmable DMA controller, Programmable interrupt controller.

Applications of Microcontrollers, Interfacing 8051 to LED's, interfacing seven segment display, ADC and DAC interfacing, Waveform generation, Stepper motor control.

TEXT BOOKS

1. Douglas V. Hall, "Microprocessors and Interfacing", Mc-Graw Hill, 2nd Edition.

2. A. K. Ray and Burchandi, "Advanced Microprocessors and interfacing", Tata Mc-Graw Hill, 2006.

3. Kenneth J. Ayala, "The 8051 Microcontroller Architecture, Programming and Applications", Thomson Publishers, 2nd Edition.

REFERENCES

1. Ajay V. Deshmukh, "Microcontrollers – Theory & Applications", Tata McGraw Hill.

2. Kenneth J Ayala, "The 8086 Microprocessors Architecture, Programming and Applications", Thomson Publishers, 2005.