16EE304 MICROPROCESSOR ARCHITECTURE AND CONTROL

Hours Per Week :

L	T	P	C
3	-	2	4

Total Hours :

L	T	P	WA/RA	SSH/HSH	CS	SA	S	BS
45	-	30	5	40	-	8	5	-
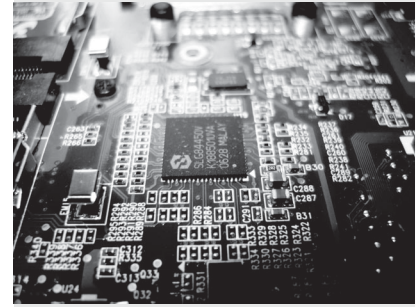
Course Description and Objectives:

This course deals with the basic architecture, assembly language programming, pin definitions, supporting chips and memory interfacing of microprocessors and microcontrollers. The objective of the course is to understand various addressing modes, different peripheral devices and their interfacing with 8086 and 8051.

Course Outcomes:

The student will be able to:

- explore the architecture of microprocessors and microcontrollers.
- select a microprocessor or a microcontroller suitable for the given application.
- write assembly language program in 8086 and 8051 for various applications.
- create necessary memory and I/O interfacing with 8086 and 8051.

SKILLS:

- ✓ *Write assembly language program for 8086 and 8051.*
- ✓ *Debug assembly language programs.*
- ✓ *Make working I/O inerfaces.*
- ✓ *Develop application programs for 8 bit and 16 bit processors / controllers.*

UNIT – 1

L-9

INTRODUCTION TO MICRO COMPUTER SYSTEM AND 8-BIT MICROPROCESSORS: Block diagram representation of microcomputer system / microprocessors and the role of various functional units, 8085 Microprocessor architecture, Clock, Memory, Bus systems, Pin description, Interrupts and Instruction set, Programming of 8085.

UNIT – 2

L-10

16-BIT MICROPROCESSORS: 8086 microprocessor architecture, Signals, Modes of operation, Instruction set, Addressing modes, Assembler directives, Procedures, Macros, Interrupts, Programming of 8086.

UNIT – 3 **L-8**

INTERFACING WITH 8086: Memory interfacing with 8086, I/O interfacing with 8086, 8255 PPI architecture, Modes, Interfacing of different I/O devices (LEDs, Display units, ADC,DAC, Stepper motor) using 8255, Basic architecture of 8259 interrupt controller, 8257 DMA controller and their applications.

UNIT – 4 **L-9**

MICRO CONTROLLERS: Architecture of 8051 microcontroller, Signals, I/O ports, Memory, Counters, Timers, Serial data I/O, Interrupts, Addressing modes, Instruction set and simple programs for 8051.

UNIT – 5 **L-9**

I/O INTERFACING WITH MICRO CONTROLLER: Programming 8051 - Timers, Serial port and Interrupts programming; LCD interfacing, ADC, DAC, Sensor interfacing, Stepper motor interfacing.

LABORATORY EXPERIMENTS

LIST OF EXPERIMENTS   Total hours: 30

1. Programs on Data Transfer Instructions
2. Programs on Arithmetic and Logical Instructions
3. Programs on Branch Instructions
4. Programs on Subroutines
5. Sorting of an Array
6. Programs on Interrupts (Software and Hardware)
7. Programs using DOS and BIOS Interrupts
8. Reading, Displaying of characters.
9. String operations: Moving, Reversing, Comparing, Scanning strings.
10. Interfacing DAC: to generate Square, Triangular, Ramp, Staircase waves.

TEXTBOOKS:

1. A. K. Ray and K.M. Bhurchandani, "Advanced Microprocessors and Peripherals", 2nd edition, Tata Mc-Graw Hill, 2012.

2. Kenneth J. Ayala, "The 8051 Microcontroller – Architecture, Programming and Applications", 3rd edition, Cengage Learning India Pvt. Ltd.,2008.

REFERENCE BOOKS:

1. Douglas V.Hall, "Microprocessors and Interfacing", Tata Mc-Graw Hill, 3rd edition, 2010

2. Liu and GA Gibson, "Micro Computer System 8086/8088 Family Architecture Programming and Design ", Prentice Hall of India, 2nd edition, 2010.

3. Myke Predko, "Programming and customizing the 8051 Microcontroller", Tata Mc-Graw Hill, New Delhi - 2nd edition, 2011.

4. Barry B. Brey, "The Intel microprocessors 8086/8088, 80186/80188, 80286, 80386, 80486, Pentium, Pentium Pro processor, Pentium II, Pentium III, Pentium 4, and Core2 with 64-bit extensions:architecture, programming, and interfacing", 8th edition, Pearson Prentice Hall, 2009.

5. Mohamed Rafiquzzaman, "Microprocessors and Microcomputer Based System Design", 2nd edition, CRC Press, 2007.