SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES

(Autonomous)

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

(Accredited by NBA)

III B.TECH.-V SEMESTER 23ECE354T MICROPROCESSORS AND MICROCONTROLLERS
23ECE354T

COURSE OBJECTIVES:

1. To learn the fundamental architectural concepts of microprocessors.

2. To gain knowledge about assembly language programming concepts.

3. To get familiar about 8086 interfacing.

4. To understand the fundamentals of the 8051 Microcontroller.

5. To learn interfacing with the 8051 Microcontroller.

UNIT I - 8086 ARCHITECTURE : 8086 Architecture: Main features, pin diagram/description, 8086 microprocessor family, internal architecture, bus interfacing unit, execution unit, interrupts and interrupt response, 8086 system timing, minimum mode and maximum mode configuration.

UNIT II - 8086 PROGRAMMING

8086 Programming: Program development steps, instructions, addressing modes, assembler directives, writing simple programs with an assembler, assembly language program development tool

UNIT III - 8086 INTERFACING

8086 Interfacing: Semiconductor memories interfacing (RAM, ROM), Intel 8255 programmable peripheral interface, Interfacing switches and LEDS, Interfacing seven segment displays, software and hardware interrupt applications, Intel 8251 USART architecture and interfacing, Intel 8237a DMA controller, stepper motor, A/D and D/A converters, Need for 8259 programmable interrupt controller

UNIT IV – MICROCONTROLLER

Microcontroller: Architecture of 8051 – Special Function Registers (SFRs) - I/O Pins Ports and Circuits - Instruction set - Addressing modes - Assembly language programming.

UNIT V - INTERFACING MICROCONTROLLER

Interfacing Microcontroller: Programming 8051 Timers - Serial Port Programming - Interrupts Programming – LCD & Keyboard Interfacing - ADC, DAC & Sensor Interfacing - External Memory Interface- Stepper Motor and Waveform generation - Comparison of Microprocessor, Microcontroller, PIC and ARM processors

S.No.	CO	Questions	BT
Unit I: (8086 Architecure)			
1	**1**	Demonstrate the 8086 internal architecture and explain its functional unit roles along with registers in detail.	**L4**
2	**1**	Define interrupts and their types. Write in detail about interrupt service routine	**L3**
3	**1**	Sketch the functional description of 8086 microprocessor with a neat diagram	**L4**
4	**1**	Summarize the timing diagram of memory read and memory write operations of 8086 microprocessor and explain in detail	**L3**
5	**1**	Examine all the pin functions of 8086 processor configured in the maximum mode	**L5**
6	**1**	Discuss about the signals involved in minimum mode operation of 8086 with a microprocessor based system with the timing diagram	**L4**
7	**1**	Describe and explain the system bus timing of 8086?	**L3**
8	**1**	(i) Describe the maximum mode configuration of 8086 with a neat diagram. (ii) Mention the functions of various signals of 8086.	**L5**
9	**1**	Identify the physical memory organization of 8086	**L4**
10	**1**	Identify and explain the Memory Management	**L3**
11	**1**	Draw and explain the pin description of 8086 with minimum mode and maximum mode signals.	**L3**

S.No.	CO	Questions	BT
Unit II: (8086 PROGRAMMING)			
1	**2**	Explain in detail about the assembler directives	**L4**
2	**2**	Examine the various addressing modes available in 8086 and Explain each mode with an example	**L3**

3	**2**	(i) Explain the data transfer, arithmetic and branch instructions of 8086 microprocessor with examples. (ii) Analyze an 8086 ALP to find the sum of two 16 bit numbers	**L4**
4	**2**	Outline and explain the Physical Memory Organization	**L3**
5	**2**	Discuss about instruction formats with examples	**L5**
6	**2**	Express the operand formats for the addressing modes with example	**L4**
7	**2**	Generalize the concept of byte and string manipulation with an example	**L3**
8	**2**	Define interrupts and their types. Write in detail about interrupt service routine.	**L5**
9	**2**	Summarize an 8086 ALP to compare two strings of same length	**L4**
10	**2**	(i) Explain in about the indirect addressing mode in 8086. (ii) Design an ALP in 8086 to multiply two 16-bit numbers	**L3**
11	**2**	Write an ALP to find the given data is positive or negative	**L4**

S.No.	**CO**	**Questions**	**BT**
Unit III: (8086 INTERFACING)			
1	**3**	(i) Manipulate DAC converter with block diagram.	**L4**
2	**3**	With a block diagram design how 8255 PPI functions in different modes to accommodate different kind of I/O devices	**L3**
3	**3**	Describe the block diagram of 8255 PPI in detail with its operating modes	**L4**
4	**3**	Discuss in detail about the seven segment display?	**L3**
5	**3**	Draw and explain the block diagram of 8259 PIC?	**L5**
6	**3**	Draw and explain the block diagram 0f 8251and explain the modes of 8251USART?	**L4**
7	**3**	Explain the different modes of operation of 8255 PPI	**L3**
8	**3**	Interface the A/D with 8086 and explain.	**L5**

9	**3**	Draw and interface the D/A with 8086 and explain	**L4**
10	**3**	Describe the block diagram of 8237 DMA in detail with its operating modes	**L3**
11	**3**	Explain about the semiconducting memories interfacing	

S.No.	**CO**	**Questions**	**BT**
Unit IV: (MICROCONTROLLER)			
1	**4**	Demonstrate the 8051 internal architecture and explain its functional unit roles along with registers in detail	**L4**
2	**4**	Examine the various addressing modes available in 8051 and Explain each mode with an example	**L3**
3	**4**	Discuss about instruction set of 8051 with examples	**L4**
4	**4**	What are the special function registers are executed in 8051	**L3**
5	**4**	Discuss in deatail the internal architecture of an 8051 microcontroller	**L5**
6	**4**	Discuss in deatail about the register set of 8051	**L4**
7	**4**	With a neat sketch explain the internal working of 8051with its signal description	**L3**
8	**4**	Explain about the I/O pins ,ports and circuits of 8051	**L3**
9	**4**	Demonstrate the Program status word register of 8051 microcontroller	**L5**
10	**4**	List the addressing modes of 8051 , explain each mode with example	**L4**
11	**4**	List any 4 instructionn sets of 8051 with a neat example	**L3**

S.No.	CO	Questions	BT
Unit V: (INTERFACING MICROCONTROLLER)			
1	**5**	Explain the different modes of operation by serial port in 8051 in detail with its associated registers	**L4**
2	**5**	Explain in detail about 8051 timers	**L3**
3	**5**	Briefly explain about the interfacing of DAC with 8051	**L4**
4	**5**	Briefly explain about the interfacing of ADC with 8051	**L3**
5	**5**	Draw and explain the interfacing of stepper motor with 8051	**L5**
6	**5**	Discuss about the keyboard interfacing with 8051	**L4**
7	**5**	Briefly explain about the Serial port communication	**L3**
8	**5**	Describe the different modes of operation of timers in 8051 microcontroller	**L3**
9	**5**	Draw and explain the functions bits in TMOD and TCON registers of 8051	**L5**
10	**5**	Write a short note on interrupts of 8051	**L4**
11	**5**	Comparision between microprocessor and microcontroller	**L3**