

## ST.JOSEPH'S COLLEGE FOR WOMEN (AUTONOMOUS), VISAKHAPATNAM

VIII SEMESTER

PHYSICS

TIME:3Hrs/week

PH 8404(4) **MICROPROCESSOR & MICROCONTROLLERS**

Max.Marks:100

w.e.f. 20AH Batch

**SYLLABUS**

### Course Objective:

- ❖ *To provide students with the knowledge of Microprocessors and Microcontrollers, their architecture, programming, memory and I/O interface, interrupts and impart practical skills using assembly language programming tools.*

### Course Outcomes:

- ❖ *Upon the successful completion of the course, students will be able to:*
- ❖ *CO1: Describe the internal architecture of microprocessors, memory addressing modes, and instruction sets.*
- ❖ *CO2: Create programs for microprocessors and explain hardware specifications.*
- ❖ *CO3: Develop interface with memory devices, decode addresses, and explain basic I/O interface concepts.*
- ❖ *CO4: Discuss interrupt processing, hardware interrupts, direct memory access, and bus interfaces.*
- ❖ *CO5: Outline the internal architecture, and use assembly language programming tools for the 8051 microcontroller*

## SYLLABUS

### UNIT- I: Microprocessors and its Architecture

8Hrs

Internal microprocessor architecture, Real mode and protected modes of memory addressing, Memory paging.

Addressing modes - Data addressing modes, program memory – addressing modes, Stack – memory addressing modes.

Instruction Set - Data movement instruction, Arithmetic and logic Instruction, Program control instructions, Assembler details.

## **UNIT–II: Programming the Microprocessor**

**8 Hrs**

Modular programming, using the keyboard and video display, Data conversions.

Hardware Specifications - Pin - outs and the pin functions, clock - generator (8284A), Bus buffering and latching, Bus timing, Ready and Wait state, Minimum mode versus maximum mode.

## **UNIT–III: Memory Interface**

**8 Hrs**

Memory devices, Address decoding, 8088 and 80188 (8-bit) memory interface, 8086, 80186, 80286 and 80386 (16-bit) memory interface.

Basic I/O Interface - Introducing to I/interface, I/O port address decoding, 8255, 8279, 8254, ADC and DAC (excluding multiplexed display & keyboard display using 8255).

## **UNIT–IV: Interrupts**

**7 Hrs**

Basic interrupt processing, Hardware interrupts, expanding the interrupt structure, 8259 APIC.

Direct Memory Access - Basic DMA operation, 8237 DMA controller. Bus Interface – PCI bus.

## **UNIT–V: 8051 Microcontrollers**

**8 Hrs**

Introduction of Microprocessors and Microcontrollers, Microcontroller: 8051 Internal Architecture, Register Structure, I/O pins, Memory Organization, 8051 addressing modes. 8051 Assembly Language Programming Tools.

### **List of Activities:**

1. Assignments
2. Student Seminars

### **Recommended Books**

1. K.J.Ayala, "The8086Microprocessor:Programming&InterfacingthePC"Penraml nternational Publishing(India) Pvt.Ltd., 1995.
2. DouglasV.Hall, "MicroprocessorsandInterfacing,ProgrammingandHardware",2/e,McGraw Hill, International Edition, 1992.
3. Muhammad Ali Mazidi and Janice Gillispie Mazidi, "The80x86IBMPC and Compatible Computers,(VolumesI&II)". 2/e, Printice–Hall,Inc., 1998.
4. WalterA. Triebel and Avatar Singh, "Software, Hardware and Applications"PHI,1995.

### **Reference Books**

1. Yu Cheng Lin and Glenn A. Gibson, "Microcomputer Systems: The8086/8088 Family Architecture, Programming and Design", PHI,1992.
2. B.B. Brey, "The Intel Microprocessors 8086/8088, 80186/80188, 80286, 80386, 80486,Pentium and Pentium pro processor architecture, programming and interfacing", 4/e, PHI,1999.