

SRI VENKATESWARA UNIVERSITY
B.Sc. DEGREE COURSE IN ELECTRONICS
SEMESTER SYSTEM WITH CBCS
SEMESTER IV
W.E.F. 2021-2022

Paper- IV TITLE: MICROPROCESSOR SYSTEMS

OBJECTIVES:

- ✚ To understand basic architecture of 16 bit and 32 bit microprocessors.
- ✚ To understand interfacing of 16 bit microprocessor with memory and peripheral chips involving system design.
- ✚ To understand techniques for faster execution of instructions and improve speed of operation and performance of microprocessors
- ✚ To understand RISC based microprocessors.
- ✚ To understand concept of multi core processors.

UNIT -I: (14Hrs)

CPU ARCHITECTURE:

Introduction to Microprocessor, INTEL-8085(μ p): Architecture, ALU, Register organization, Pin configuration of 8085, Address, data and control Buses, Multiplexing and Demultiplexing of Address/Data bus.

8086 Microprocessor: Internal Architecture- Bus interface unit, Execution unit(control circuitry, Instruction decoder, ALU, Flag register, GPRs, Pointers and Index register), Pin description, Addressing modes.

UNIT -II: (12 Hrs)

8085 Instruction Set and programming Examples:

Instruction classification: Data transfer Instructions, Logical Instructions, Arithmetic Instructions, Branching Instructions, Stack I/O and Machine Control instructions. Instruction and Data formats, Addressing modes. Assembly Language Programmes for Addition, Subtraction, Multiplication, Division, largest and smallest number in an array. BCD to ASCII and ASCII to BCD.

UNIT -III: (12Hrs)

Basic 8086 Configurations & interrupts:

Minimum mode and Maximum Mode, pin definitions, Bus timings, Memory interfacing, Instruction set of 8086, Interrupts of 8086, Interrupt Priority Management

UNIT -IV: (12Hrs)

I/O Interfaces:

Serial Communication interface: Classification, protocols, 8251A PCI Parallel Communication Interface: 8255A PPI, Interfacing DAC 0808 & ADC 0808, Programmable Timers: IC8253/54, Modes of operation, Interfacing.

UNIT -V: (10Hrs) ARM PROCESSOR: Introduction to 16/32 bit processors, Arm architecture & organization, Arm based MCUs, Programming model, Instruction set.

TEXT BOOKS:

- ❖ Microprocessor Architecture, Programming and Applications with the 8085 – Penram International Publishing, Mumbai.- Ramesh S. Gaonakar
- ❖ Microcomputer Systems the 8086/8088 family – YU-Cheng Liu and Glenn SA Gibson
- ❖ Microcontrollers Architecture Programming, Interfacing and System Design – Raj Kamal Chapter: 15.1, 15.2, 15.3, 15.4.1
- ❖ 8086 and 8088 Microprocessor by Tribel and Avatar Singh

REFERENCES:

- Microprocessors and Interfacing – Douglas V. Hall
- Microprocessor and Digital Systems – Douglas V. Hall
- Advanced Microprocessors & Microcontrollers - B.P.Singh & Renu Singh – New Age
- The Intel Microprocessors – Architecture, Programming and Interfacing – Bary B. Brey.
- Arm Architecture reference manual –Arm ltd.

OUTCOMES:


- The student can gain good knowledge on microprocessor and implement in practical applications
- Design system using memory chips and peripheral chips for 16 bit 8086 microprocessor.
- Understand and devise techniques for faster execution of instructions, improve speed of operations and enhance performance of microprocessors.
- Understand multi core processor and its advantages

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SEMESTER SYSTEM WITH CBCS
SEMESTER IV
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ELECTRONICS LAB-IV
MICROPROCESSOR SYSTEMS

LAB LIST:

Programs using Intel 8085 /8086

1. Addition and Subtraction (8 bit and 16-bit)
2. Multiplication and Division (8-bit)
3. Largest number in an array.
4. Smallest number in an array.
5. BCD to ASCII and ASCII to BCD .
6. Program To Convert Two Bcd Numbers into Hex
7. Program To Convert Hex Number into BCD Number.
8. Program To Find The Square Root Of A Given Number.
9. Interfacing Experiments Using 8086 Microprocessor (Demo):
 - a. Traffic Light Controller
 - b. Elevator,
 - c. 7-Segment Display


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SRI VENKATESWARA UNIVERSITY
B.Sc. DEGREE COURSE IN ELECTRONICS
IV SEMESTER
(Revised Syllabus under CBCS w.e.f. 2021-22)
MODEL PAPER

Part-II Electronics Microprocessor Systems

Time : 3 Hours

Max. Marks : 75

Section-A

Answer any FIVE of the following questions

(Marks 5X5 = 25 Marks)

1. Explain about various flags in 8086 μ P.
2. Describe the multiplexing and de-multiplexing of buses in 8085 μ P.
3. Explain about addressing modes of 8085 μ P.
4. Write an ALP to perform 8-bit multiplication.
5. Write a brief note on 8086 interrupt priorities.
6. Give the mode and command instruction formats of 8251A.
7. Give the control word format for 8253/54 programmable timer.
8. Distinguish between RISC and CISC processors.

Section-B

Answer ALL the following questions.

(Marks 5X10 = 50 Marks)

9. (a) Draw the architecture of 8086 μ P and explain in detail.
(or)
(b) Draw the pin diagram of 8085 μ P and describe each pin.
10. (a) List out all the instructions in data transfer group and explain each with one example.
(or)
(b) Write an ALP for BCD to ASCII conversion.
11. (a) Explain the interrupt structure of 8086 μ P.
(or)
(b) Define Bus cycle. Explain minimum mode read and write bus timing with the help of timing diagram.
12. (a) Discuss the organization and architecture of 8251A USART with the help of functional block diagram.
(or)
(b) Illustrate different modes of operation of 8255A PPI.
13. (a) Describe the Programming model of registers and buses in ARM family MCUs.
(or)
(b) Explain in detail Arithmetic instructions for ARM processors. How Barrel shifter is used with these instructions

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Paper: V MICROCONTROLLER AND INTERFACING

OBJECTIVES:

- To understand the concepts of microcontroller based system.
- To enable design and programming of microcontroller based system.
- To understand interfacing of peripherals.

UNIT-I: (10Hrs)

Introduction, comparison of Microprocessor and micro controller, Evolution of microcontrollers from 4-bit to 32 bit , Development tools for micro controllers, Assembler-Compiler-Simulator/Debugger.

UNIT –II (15Hrs)

Microcontroller Architecture:

Overview and block diagram of 8051, Architecture of 8051, program counter and memory organization, Data types and directives, PSW register, Register banks and stack, pin diagram of 8051, Port organization, Interrupts and timers.

UNIT-III: (10Hrs)

Addressing modes, instruction set of 8051:

Addressing modes and accessing memory using various addressing modes, instruction set: Arithmetic, Logical, Simple bit, jump, loop and call instructions and their usage. Time delay generation and calculation, Timer/Counter Programming,

Unit -IV: (10Hrs)

8051 Programming Examples:

Assemble language programming Examples: Addition, Multiplication, Subtraction, division, arranging a given set of numbers in largest/smallest order.

UNIT-V : (15Hrs)

Interfacing and Applications of Microcontroller:

Interfacing of – PPI 8255, DAC (0804), Temperature measurement (LM35), interfacing seven segment displays, displaying information on a LCD, control of a stepper Motor (Uni-Polar), Generation of different waveforms using DAC.

TEXT BOOKS:

1. The 8051 microcontroller and embedded systems using assembly and c-kennet j. Ayalam, Dhananjay V. gadre, cengage publishers
- 2.The 8051 microcontrollers and Embedded systems - By Muhammad Ali Mazidi and Janice Gillispie Mazidi – Pearson Education Asia, 4th Reprint, 2002.

REFERENCE BOOKS:

1. Microcontrollers Architecture Programming, Interfacing and System Design – Raj Kamal.
2. The 8051 Microcontroller Architecture, Programming and Application - Kenneth J. Ajala , west publishing company (ST PAUL, NEW YORK, LOS ANGELES, SAN FRANCISCO).
3. Microcontroller theory and application-Ajay V. Deshmukh

OUTCOMES:

- The student can gain good knowledge on microcontrollers and implement in practical applications
- Learn Interfacing of Peripherals to Microcontroller
- Get familiarized with Real time operating system

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ELECTRONICS LAB-V

MICROCONTROLLER LAB

LAB LIST:

1. Addition And Subtraction Of Two 8-Bit Numbers.
2. Multiplication And Division Of Two 8-Bit Numbers.
3. Largest number /smallest in an array.
4. Exchange Of Higher And Lower Nibbles In Accumulator.
5. Addition Of Two 8-Bit Numbers (Keil Software).
6. Addition Of Two 16-Bt Numbers (Keil Software)
7. Subtraction Of Two 8-Bit Numbers (Keil Software).
8. Subtraction Of Two 16-Bit Numbers (Keil Software).
9. Multiplication Of Two 8-Bit Numbers (Keil Software).
10. Program For Swapping And Compliment Of 8-Bit Numbers (Keil Software).
11. Program To Find The Largest Number In Given Array (Keil Software).
12. Program To Find The Smallest Number In Given Array (Keil Software).
13. Interfacing Led To 8051 Microcontroller (Keil Software).
14. Interfacing Buzzer To 8051 Microcontroller (Keil Software).
15. Interfacing Relay To 8051 Microcontroller (Keil Software).
16. Interfacing Seven Segments To 8051 Microcontroller (Keil Software).

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Model paper
Part-II Electronics
Microcontroller and Interfacing

Time : 3 Hours

Max. Marks : 75

Part-A

Answer any FIVE questions

Each question carries 5 Marks

(Marks 5X5 = 25 Marks)

1. Write about evolution of microcontrollers.
2. List and explain some 8051 16-bit registers.
3. Explain CALL instruction and stack.
4. Write an ALP program for Addition of two 8-bit numbers.
5. Write a short note on temperature measurement.
6. Write short notes on microcontroller testing tools.
7. Explain about stack pointer.
8. Draw the pin diagram for DAC.

PART-B

Answer all questions.

(Marks 5X10 = 50 Marks)

9. (a) Explain Difference between Microprocessor and Microcontroller.
(or)
(b) Draw the pin diagram of 8051 μ C and explain each pin in detail.
10. (a) Explain the Architecture of 8051 μ C and explain in detail.
(or)
(b) Explain about the Port organization of 8051 μ C.
11. (a) Explain about different types of Addressing modes in 8051 μ C.
(or)
(b) Explain about (i) Single bit instruction (ii) Loop instruction (iii) Arithmetic Instruction with one example each.
12. (a) Write an ALP program to pick out largest number in an array.
(or)
(b) Write an ALP for (i) 8 – bit addition (ii) 8- bit Multiplication.
13. (a) Briefly explain the Architecture of 8255 PPI.
(or)
(b) Explain about interfacing of stepper motor to 8051 μ C.