



Kadi Sarva Vishwavidyalaya

Gandhinagar-382015

B.E Semester: 8

Electronics & Communication Engineering

Subject Name: Advanced Microprocessor

Sub Code: EC- 802-A (E P II)

A. Course Objective

The educational objectives of this course are

- To understand the basics and Evolution of microprocessor.
- To study about the functional components of 8086 microprocessor in detail.
- To study the various types of instructions provided by 8086 and its addressing Modes.
- To study about Serial and interrupt Programming.
- To study concepts of Interfacing with Memory, 8255(PPI), 8253/54(Timer/Counter), 8279(Keyboard and Display), 8237(DMA) and 8259(Interrupt Controller).

B. Teaching / Examination Scheme

| Teaching Scheme | | | | Total Credit | Evaluation Scheme | | | | | |
|-----------------|-----|-----|-------|--------------|-------------------|-------|-------|-------|-------------|-------|
| L | T | P | Total | | Theory | | IE | CIA | Pract./Viva | Total |
| Hrs | Hrs | Hrs | Hrs | | Hrs | Marks | Marks | Marks | Marks | Marks |
| 4 | 0 | 2 | 6 | 5 | 3 | 70 | 30 | 20 | 30 | 150 |

C. Detailed Syllabus

1 Introduction

Block Diagram of Microcomputer, Comparison between 8085 and 8086 microprocessor, Intel 80x86 Evolutions.

2 Architecture and Functional Block Diagram of Microprocessor 8086:

Features of 8086 microprocessor, Pin Configuration of 8086 microprocessor, Architecture of 8086 Microprocessor, Instruction Queue and Pipelining, Segmentation of Memory 8086 microprocessor, Methods for Generating Physical Address, Memory Pointers, Real mode memory addressing, Addressing modes.



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3 **Programming of Microprocessor:**

Data Transfer instructions, Stack Instruction, Input and Output Instructions, Arithmetic and logic instructions, Flags control instructions, string instruction, Branching Instructions, External Synchronization and Machine Control Instructions, Assembler directives, program development tools.

4 **Interrupt of 8086 Microprocessor:**

Basic of Interrupts, The purpose of interrupts, Interrupt instructions, the operation of a real mode interrupt, Interrupt flag bits, Software Interrupts, Hardware interrupts: INTR and INTA.

5 **Memory Interfacing with 8086 Microprocessor.**

Semiconductor Memory Fundamentals, Memory Types, Basic Concepts of memory interfacing, Memory Decoding, Supporting Circuits used for Interfacing, Memory Mapping with 8086.

6 **8086 Peripheral Hardware specifications:**

Programmable Peripherals Interface PPI 8255, Programmable Interval Timer 8253/8254, Programmable Interrupt Controller 8259, USART-8251, Programmable Keyboard/Display Interface 8279. Direct Memory Interface 8237 : All Interface Block Diagram's

7 **80186, 80286, 80386 and 80486 microprocessors:**

Features and Comparison between all Microprocessors.

8 **Pentium, Pentium Pro, Pentium II, Pentium III, Pentium IV and Core2 microprocessors:**

Introduction to Pentium microprocessor, Special Pentium registers, Basic and additional features of Pentium Pro, Pentium II, Pentium III, Pentium IV and Core2 microprocessors.

9 **RISC & CISC**

RISC vs. CISC Architecture, SuperSPARC Architecture

D. Lesson Planning

| Sr. No. | Lectures (Hours) | Weightage in % in Exam | Topics |
|---------|------------------|------------------------|---|
| 1. | 03 | 05 | Introduction Block Diagram of Microcomputer, Comparison between 8085 and 8086 microprocessor, Intel 80x86 Evolutions. |
| 2. | 10 | 15 | Architecture and Functional Block Diagram of Microprocessor 8086: Features of 8086 microprocessor, Pin Configuration of 8086 microprocessor, Architecture of 8086 Microprocessor, Instruction Queue |



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| | | | |
|--------------|----|-----|---|
| | | | and Pipelining, Segmentation of Memory 8086 microprocessor, Methods for Generating Physical Address, Memory Pointers, Real mode memory addressing, Addressing modes. |
| 3. | 10 | 15 | Programming of Microprocessor: Data Transfer instructions, Stack Instruction, Input and Output Instructions, Arithmetic and logic instructions, Flags control instructions, string instruction, Branching Instructions, External Synchronization and Machine Control Instructions, Assembler directives, program development tools. |
| 4. | 04 | 05 | Interrupt of 8086 Microprocessor: Basic of Interrupts, The purpose of interrupts, Interrupt instructions, the operation of a real mode interrupt, Interrupt flag bits, Software Interrupts, Hardware interrupts: INTR and INTA. |
| 5. | 05 | 10 | Memory Interfacing with 8086 Microprocessor. Semiconductor Memory Fundamentals, Memory Types, Basic Concepts of memory interfacing, Memory Decoding, Supporting Circuits used for Interfacing, Memory Mapping with 8086. |
| 6. | 08 | 15 | 8086 Peripheral Hardware specifications: Programmable Peripherals Interface PPI 8255, Programmable Interval Timer 8253/8254, Programmable Interrupt Controller 8259, USART-8251, Programmable Keyboard/Display Interface 8279. Direct Memory Interface 8237 : All Interface Block Diagram's |
| 7. | 5 | 10 | 80186, 80286, 80386 and 80486 microprocessors: Features and Comparison between all Microprocessors. |
| 8. | 10 | 15 | Pentium, Pentium Pro, Pentium II, Pentium III, Pentium IV and Core2 microprocessors: Introduction to Pentium microprocessor, Special Pentium registers, Basic and additional features of Pentium Pro, Pentium II, Pentium III, Pentium IV and Core2 microprocessors. |
| 9 | 5 | 10 | RISC & CISC RISC vs. CISC Architecture, SuperSPARC Architecture |
| Total | 60 | 100 | |



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E. Instructional Method And Pedagogy (Continuous Internal Assessment (CIA) Scheme)

1. At the start of course, the course delivery pattern, prerequisite of the subject will be discussed
2. Lecture may be conducted with the aid of multi-media projector, black board, OHP etc.
3. Attendance is compulsory in lectures, practicals and Tutorial which carries 05 Marks.
4. At regular intervals assignments is given. In all, a student should submit all assignments of 05 marks each.
5. Classroom participation and involvement in solving the problems in Tutorial rooms carries 05 Marks.
6. Viva Voce will be conducted at the end of the semester of 05 Marks.
7. One internal exam of 30 marks is conducted as a part of mid semester evaluation.
8. Experiments shall be performed in the laboratory related to course contents.
9. The course includes a laboratory, where students have an opportunity to build an appreciation for the concept being taught in lectures.

F. Suggested List Of Experiments:

1. Write a Program to Perform 8 bit Addition/ Subtraction using Accumulator.
2. Write a Program to Perform 8 bit Multiplication/ Division using Accumulator.
3. Write a Program to Find Smallest Number in a given array of five numbers.
4. Write a Program to Find Largest Number in a given array of five numbers.
5. Write a Program to Transfer block of data from one memory location to another memory location.
6. Write a Program Sum of 'n' Consecutive Numbers.
7. Write a Program to Convert BCD Number to Decimal Number.
8. Write a Program to Separate Even or Odd Number for a given array.
9. To Understand Interface 8255 (Programmable Peripheral Interface) with 8086 Microprocessor.
10. To Understand Interface 8279 (Keyboard and Display Controller) with 8086 Microprocessor.
11. To Understand Interface 8251 (USART) with 8086 Microprocessor.
12. To Analyze Operation sequence of instruction (Timing Diagram) using Logic Analyzer.

G. Students Learning Outcomes

On successful completion of the course:

The student can learn about detailed aspects about 8086 microprocessor and also understand the concept of interfacing with peripherals. Also they understand the features and application of Pentium Processor and Intel processor.



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H. Recommended Study Materials:

TEXT BOOKS:

- Microprocessors: /8088, 80186/80188, 80286, 80386, 80486, Pentium Family, 2nd Edition, Nilesh B. Bahadure, PHI learning Pvt Limited.
- 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, 8th Edition , Barry B. Brey ,Pearson Education.

REFERENCE BOOKS:

- Microprocessors and Interfacing By Douglas V Hall Revised Second Edition, McGraw Hill Publication
- The 8088 and 8086 Microprocessors, Programming, Interfacing, Software, Hardware and Applications, Fourth Edition, By Walter A Triebel and Avtar Singh, Pearson Education.

