COURSE OBJECTIVES:

1.To learn importance of microprocessors and microcontrollers

2.To learn and understand architecture and programming of 8086 processor.

3.To learn and understand interfacing techniques like memory and I/O Interfacing with 8086.

4.To learn and understand architecture and programming of 8051 microcontroller.

5.Tolearn and understand generation of time delay, serial communication and interrupts.

6.To learn and understand the development of microprocessor and microcontroller based system.

COURSE OUTCOMES:

The student will be able to

1. Understand the theory and basic architecture of microprocessor

2.Program a microprocessor system using assembly language

3. Understand and capable or interfacing the microprocessor to the I/O devices.

4.Develop simple applications on microprocessor and microcontroller based systems

OBJECTIVES:

To illustrate the architecture of 8085 and 8086 microprocessors.

To introduce the programming and interfacing techniques of 8086 microprocessor.

To analyse the basic concepts and programming of 8051 microcontroller

To understand the interfacing circuits for various applications of 8051 microcontroller.

To introduce the architecture of advanced microprocessors and microcontrollers.

10. Course prerequisites:

Students should have knowledge on thebasic of

Digital circuits and

Programming languages

**Lecture plan**

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| --- | --- | --- | --- | --- | --- |
| **unit** | **Lecturer No.** | Topic to be covered | Objective | Outcome | Reference |
| **Unit-1**  **Introduction to 8085 Microprocessor Architecture** | **1.** | Programming modal of 8085: CPU ,BUS concept and definition of microprocessor and general description of microprocessor | To learn importance of microprocessors and microcontrollers  To illustrate the architecture of 8085 and 8086 microprocessors. | History and evolution of computer | 1 |
|  | **2.** | Input/output devices buffers encoders decoders | To understand basic flow of data and interpretation by up | Buffering techniques and selection of lines for addressing | 1,2,3 |
| **3.** | Latches and memories and some numerical practice about memories | Type of memories and application | Memory bank sizing | 1,2,3 |
| **4.** | Internal data operation and Registers and stack pointer ,program counter | Data handling by the microprocessor | How structure of the microprocessor | 2,3 |
| **5.** | About microprocessor architecture and microprocessor application | To have an in depth knowledge of the architecture of 8-bit microprocessor -8085 | Application of MP in industrial use | 3,4 |
| **6.** | Peripheral Devices and memory organization and Interrupts | Different modes of memory addressing | Different techniques of addressing memory | 3,4 |
| **Unit-2**  **8085 Microprocessor instructions** | **7** | General discussion about 8085 instructions and classification | set and to develop assembly To study the Instruction language programs. | Have concepts of type of instruction | 4 |
| **8** | Instruction format and timing and process of timing diagram | How instruction fetch and execute | Opcode and operand | 4 |
|  |
| **9** | Instruction set classification according to word length and described it | Classification of instruction | Student understands the various addressing modes required for assembly language  programming and can calculate the physical address | 5 |
| **10** | Data transfer group | Moving of data | develop various assembly language programs | 5 |
| **11** | Arithmetic’s instruction groups | Basic arithmetic operation | Develop simple program of arithmetic operation | 5 |
| **12** | Logical instruction groups | Decision taking ability | Develop programs using logical instruction | 5 |
| **13** | Branch instruction , machine instruction and control instruction | Under stand loops | Able to make program using while, for, if | 5 |
| **14** | Programming and debugging and subroutines | Debugging compiling call and return from subroutine | Debugging and running the program | 5 |
| **15** | Problems of instructions and programming | Practicing the logical problems | Convert algo and flowchart into assembly language program | 6 |
| **Unit -3**  **8085 Microprocessor interfacing** | **16** | general discussion about microprocessor interfacing and explain different types interfacing | To introduce the programming and  interfacing techniques of 8086 microprocessor.   |  | | --- | |  | | Concept of interfacing | 7 |
| **17** | 8085 microprocessor interfacing with 8259 and their application | Understand interfacing with subsystem | How sub-controller works for specific task on behalf of microprocessor | 7 |
|  |
| **18** | 8085 microprocessor interfacing with 8257 and their application | How DMA controller works | Understand the role of sub-controller for transfer of large data | 7 |
| **19** | 8085 microprocessor interfacing with 8255 and their application | Transfer of large size data | Student understands the architecture of 8255 PPI.  understands the various command words and modes of operation of 8255 PPI. | 7 |
| **20** | 8085 microprocessor interfacing with 8253 and 8155 and their application | Under stand timer | Importance of timer in MP based S/m | 7 |
| **21** | A/D conversion, memory, keyboard and display | Understand basic analog to digital and peripheral interface | How keyboard works with micoprocessor based S/m | 7 |
| **22** | interfacing (8279) | Understand hardware interrupt controller | Student understands the architecture of 8279 | 8 |
| **23** | Problem class of 8085 microprocessor interfacing | Interfacing of various external devices | Concepts of various external devices | 8 |
| **Unit-4**  **8086 Microprocessor and instruction set of 8086** | **24** | General description of 8086 microprocessor and its application | Student understands the architecture of 8085 and 8086 processorevaluation and brief about the up based pc system, 8086 | Student be able to tell the history of processor and will know the detail of every blocks of up based pc model | 2 |
| **25** | Architecture of microprocessor 8086 and architecture of INTEL 8086(BUS interface Unit, execution unit) | To discuss the instruction set of 8086 with example program | Student will be able to understand the instruction of 8086 | 2 |
|  | **26** | Resister organization , memory addressing | To discuss memory organization and organization | Student gets complete knowledge of registers and memory system of 8086 processor | 2 |
| **27** | Memory segmentation, Operating Modes | Operating modes of memory | Student understands the single and multi-processor mode of 8086 processor. | 2 |
| **28** | Addressing modes and instruction format | Different ways of adressing | understands the various addressing modes required for assembly language  programming and can calculate the physical address. | 2 |
| **29** | Discussion on instruction set groups, data transfer | Instruction classification | Student can develop various assembly language programs in real time applications | 2 |
| **30** | Arithmetic ,logic string branch control transfer processor control | Arithmetic and logical operation | Develop assembly language program | 2 |
| **31** | Interrupt : hardware interrupts, responses and types | To discuss interrupt concepts, different type and example | The student will be able to list out different type of interrupt and wavefunction | 2 |
| **Unit-5**  **Basic computer Architecture &**  **Types of memory** | **32** | basic computer Architecture: central processing unit and input/output interfacing | To understand concepts of computer, ports for interfacing | Understand the architechture of computer | 2 |
| **33** | memory classification volatile and non-volatile memory | Different classification of memory | Different memories the their characteristics | 2 |
| **34** | primary and secondary memory, static and Dynamic memory | Working of different memory | Application of memory | 2 |
| **35** | Logical, virtual and physical memory | Concepts of memory management | Optimized use of memory | 2 |
| **36** | Types of memory: magnetic core memory, binary cell, ROM architecture and different types of ROM | Architecture of memory | Internal structure of memory and their working | 2 |
| **37** | RAM architecture, PROM,PAL, PLA, flash and cache memory | Classification of ram on basis of use | 4. Student can develop the interfacing of memory (RAM, ROM, PROM, EEPROM) | 2 |
| **38** | SDRAM, RDRAM, and DDRAM | Difference and application of memory | Interfacing of memory | 6 |
| **39** | Memory latency, memory bandwidth, memory seek time | Characteristic of memory | Which memory to be used in different situations/places | 6 |
| **40** | Problem class | Clearing douts |  |  |

**TEXT BOOKS**

1. Ramesh S. Gaonkar ,”Microprocessor – Architecture, Programming and Applications with the 8085” Penram International Publisher , 5th Ed.,2006
2. Yn-cheng Liu,Glenn A.Gibson, “Microcomputer systems: The 8086 / 8088 Family architecture, Programming and Design”, second edition, Prentice Hall of India , 2006
3. Kenneth J.Ayala, ’The 8051 microcontroller Architecture, Programming and applications‘ second edition ,Penram international.

**REFERENCES**

1. Douglas V.Hall, “ Microprocessors and Interfacing : Programming and Hardware”, second edition , Tata Mc Graw Hill ,2006.
2. A.K.Ray & K.M Bhurchandi, “Advanced Microprocessor and Peripherals – Architecture, Programming and Interfacing”, Tata Mc Graw Hill , 2006.
3. Peter Abel, “ IBM PC Assembly language and programming” , fifth edition, Pearson education / Prentice Hall of India Pvt.Ltd,2007.
4. Mohamed Ali Mazidi,Janice Gillispie Mazidi,” The 8051 microcontroller and embedded systems using Assembly and C”,second edition, Pearson education /Prentice hall of India , 2007.