17CS32E4 - MICROPROCESSOR AND INTERFACING

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| **Course Category:** | Professional Elective | **Credits:** | 3 |
| **Course Type:** | Theory | **Lecture – Tutorial – Practical:** | 3-0-0 |
| **Prerequisite:** | Need to have knowledge on computer organization and architecture basics | **Sessional Evaluation:**  **Univ.Exam Evaluation:**  **Total Marks:** | 40  60  100 |
| **Course Objectives** | * Get an overview of microcomputer-based applications * Gain the knowledge on typical microprocessor design and overview off dual microprocessor architecture based on different processors | | |

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| **Course Outcomes** | Upon successful completion of the course, the students will be able to: | |
| CO1 | Understand the basics of 8086 microprocessors and its Instructions |
| CO2 | Learn writing Assembly Language Program (ALP) using 8086 instructions |
| CO3 | Correlate High Level Programming constructs and their implementations in ALP |
| CO4 | Study various advanced programming constructs of ALP |
| CO5 | Conceptualize techniques for I/O communication, Interrupts and DMA |
| CO6 | Explore Digital interfacing and Peripheral Buses like USB, PCI Express. |

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| **Course Content** | UNIT – I  Introduction to MicroProcessors: Main features of 8086 microprocessor, 8086 pin Assignments, 8086 Microprocessor family and Internal architecture, Introduction to Programming using 8086, a Basic 8086 Micro-computer System overview  Instruction Set of 8086 microprocessor – Data transfer instructions, Arithmetic instructions, Bit manipulation Instructions, String Instructions, Program Execution Transfer Instructions, Processor Control Instructions  UNIT – II  **8086 Assembly Language Programming:**  Writing assembly language program for assemblers – Program format, Assembler directives – SEGMENT, ENDS, ASSUME, END, Naming Data and Addresses – EQU, DB, DW and DD directives, Accessing Named Data with Program Instructions, Naming Addresses – Label, Initializing Segment Registers. Assembly Language Tools – Editor, Assembler, Linker, Locator, Debugger, Emulator.  UNIT – III  Implementing Standard Program Structure in 8086 Assembly language: Simple Sequence programs, Jumps, Flags and Conditional Jumps, If-then, if-then-else and Multiple if-then-else programs, while-do programs, Repeat-until Programs, Instruction timing and Delay Loops.  UNIT – IV  **Strings, Procedures and Macros:** 8086 String instructions, Procedures – Writing and Using Procedures, Usage of Stack, Parameter Passing and Return values, Recursive Procedures, Macros and Procedures Compared, Macro definition and usage along with parameter passing.  UNIT – V  **Input and Output Modes and Interfacing:** Peripheral devices, Input/output devices, Controllers, I/O modes in computer System, Programmed I/O mode, Interrupt mode of I/O,8086 Interrupts and Interrupt Responses, Hardware Interrupt Applications, 8259A Priority Interrupt Controller, Software Interrupt Applications, Direct Memory Access (DMA) mode I/O.  **UNIT – VI**  **Digital Interfacing:** Programmable Parallel Ports and Handshake I/O, 8279 Circuit Connections and operations overview, Computer System Peripheral buses – USB, PCI Express. |
| **Text Books and References:** | **Text Books:**   1. Douglas V. Hall and SSSP Rao, Microprocessors and interfacing, TMH, 3rd edition.   **References:**   1. “Microprocessors: Principles and Applications” by A Pal 2. “Introduction to Microprocessors and Microcontrollers” by Crisp John Crisp |
| **E-Resources** | 1. [**https://nptel.ac.in/courses**](https://nptel.ac.in/courses) 2. [**https://freevideolectures.com/university/iitm**](https://freevideolectures.com/university/iitm) |