

### Microprocessor, Micro Computers and Interfaces (EC-5001)

Course Code	EC- 5001	Credits-4	L – 3, T-1, P-0
Name of the Course	<b>Microprocessor, Micro Computers and Interfaces</b>		
Lectures to be Delivered	52 (1 Hr Each) (L= 39, T = 13 for each semester)		
Semester End Examination	<i>Max. Marks: 100</i>	<i>Min. Pass Marks: 40</i>	Maximum Time: 3hrs
Continuous Assessment (based on sessional tests (2) 50%, Tutorials/Assignments 30%, Quiz/Seminar 10%, Attendance 10%)	<i>Max. Marks: 50</i>		

#### Instructions

- For Paper Setters:** The question paper will consist of five sections A, B, C, D, and E. Section E will be Compulsory, it will consist of a single question with 10-20 subparts of short answer type, which will cover the entire syllabus and will carry 40% of the total marks of the semester end examination for the course. Section A, B, C and D will have two questions from the respective sections of the syllabus and each question will carry 15% of the total marks of the semester end examination for the course.
- For Candidates:** Candidates are required to attempt five questions in all selecting one question from each of the sections A, B, C and D of the question paper and all the subparts of the questions in section E. Use of non-programmable calculators is allowed.

#### Section – A

**Microprocessors;** Microprocessors Instruction Set and Computer languages; From Large Computers to Single-Chip Micro controllers. Microprocessor Architecture and Its operations;

**Memory;** Input and Output(I/O) Devices; Example of a Microcomputer System; Review: Logic Devices for Interfacing.

**The 8085 MPU;** Example of an 8085 Based Microcomputer; Memory Interfacing; Interfacing the 8155 Memory Segment; Testing and Troubleshooting Memory Interfacing Circuits; How Does an 8085 – based Single-Board Microcomputer Work? Basic Interfacing Concepts; Interfacing Output Displays; Interfacing Input Devices; Memory-Mapped I/O; Testing and Troubleshooting I/O Interfacing Circuits.

#### Section – B

**The 8085 programming Model;** Instruction Classification; Instruction and Data Format; How to Write, Assemble and Execute a Simple program; Overview of the 8085 Instruction Set. Data Transfer (Copy) Operations; Arithmetic Operations; Logic Operations; Branch Operations; Writing Assembly Language programs; Debugging a program; Some Puzzling questions and Their Answers.

**Programming Techniques:** Looping, Counting, and Indexing; Additional Data Transfer and 16-Bit Arithmetic Instructions; Arithmetic Operations Related to Memory; Logic Operations: Rotate; Logic Operations: Compare; Dynamic Debugging.

**Counters and time Delays;** Illustrative program: Hexadecimal Counter; Illustrative program: Zero-to-Nine (Modulo Ten) Counter; Illustrative Program: Generating Pulse Waveforms; Debugging Counter and Time-Delay Programs. Stack; Subroutine; Restart, Conditional Call, and Return Instructions; Advanced Subroutine Concepts.

#### Section – C

**The 8085 Interrupt;** 8085 Vectored Interrupts; Restart as Software Instructions; Additional I/O Concepts and Processes.

Digital-to-Analog (D/A) Converters; Analog-to-Digital (A/D) Converters.

8155 I/O and timer; 8279 Keyboard/Display Interface: Basic Concepts in programmable Devices; The 8155: Multipurpose programmable Device; the 8279 programmable Keyboard/Display Interface.

## **Section – D**

The 8255A programmable Peripheral Interface; Illustration: Interfacing Keyboard and Seven-Segment Display; Illustration: Bidirectional Data Transfer Between Two Microcomputers; The 8254 (8253) programmable Interval Timer; The 8259A programmable Interrupt Controller; Direct Memory Access (DMA) and the 8237 DMA Controller Basic Concepts in Serial I/O; Software-Controlled Asynchronous Serial I/O; The 8085-Serial I/O Lines: SOD and SID; Hardware-Controlled Serial I/O Using Programmable Chips.

Study of Architecture of Pentium family processor – Processor, registers, mmu, instruction set, on chip cache, interfaces. (Only Brief Discussion)

### **BOOKS:**

1. Ramesh S. Gaonkar, “Microprocessor Architecture, programming, and Applications with 8085”, 4<sup>th</sup> edition, Penram International Publishing(India), 2000.
2. Aditya P. Mathur, “Introduction to Microprocessors”, 3<sup>rd</sup> edition, Tata McGraw Hill Publishing House, New Delhi, 1989.
3. Y. Rajasra, Advance Microprocessor, New Age International Publishers, New Delhi.