

## **Microprocessor Based Design**

**Course Title:** Microprocessor Based Design

**Course No:** CSC324

**Nature of the Course:** Theory + Lab

**Semester:** V

**Full Marks:** 60 + 20 + 20

**Pass Marks:** 24 + 8 + 8

**Credit Hrs:** 3

**Course Description:** This course covers range of issues to be considered in designing a microprocessor-based system. First, the criteria for selecting a microprocessor/microcontroller are discussed, and second, the hardware and software aspects of designing systems are focused.

**Course Objective:** The course objective is to demonstrate the concept of microprocessor and to be able to design a microprocessor based system to get desired results. It also emphasizes on hardware interfacing of 8051 to develop solutions of real world problems.

### **Course Contents:**

#### **Unit 1: Introduction to Microcontroller (12 Hrs.)**

Overview of Typical Microcontroller, The Picocontroller, The Microcontroller's Memory, The Central Processor, Timing, The I/O Interface, The Address, Data, and Control Buses, The Picocontroller Design, Software/Firmware Development Architecture, Interfacing, Interfacing Types, Interfacing Techniques, Introduction of PIC, and ARM

#### **Unit 2: Sensors and Actuators (7 Hrs.)**

Sensors, Analog to Digital Conversion, Control Algorithm, Digital to Analog Conversion, Actuator

#### **Unit 3: Bus and Communication Technology (8 Hrs.)**

Common Parallel and Serial Bus Systems, Topology, Arbitration, Synchronization, CAN-Protocol, Bluetooth, PCI, ISA, WIFI

#### **Unit 4: Introduction to 8051 Microcontroller and Programming (12 Hrs.)**

8051 architecture and pin diagram, Registers, Timers, Counters, Flags, Special Function Registers, Addressing Modes, Data types, Instructions and Programming, Single-bit Operations, Timer and Counter Programming, Interrupts Programming, Serial Communication, Memory Accessing and their Simple Programming Applications

#### **Unit 5: Electromagnetic Interference and Compatibility (6 Hrs.)**

Basics of PCB Design, Design Consideration, Impact of EMI, Sources of EMI, Types of Noise, Grounding, Shielding, EMI, and EMC Standard

### **Laboratory works:**

Programming and Application development around 8051, Interfacing to ADC, DAC, and Sensors

### **Recommended Books:**

1. D. V. Hall, **Microprocessors and Interfacing - Programming and Hardware**, McGraw Hill
2. K. J. Ayala, **The 8051 Microcontroller: Architecture, Programming and Applications**, West
3. Mazidi, M.A., **The 8051 Microcontroller and Embedded System**, Pearson Education (2008)
4. T. Bansod, Pratik Tawde, **Microcontroller Programming (8051, PIC, ARM7 ARM Cortex)**, Shroff Publishers & Distributors Pvt. Ltd