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