

## Course Syllabi: UEE845 Microcontrollers and Applications (L : T : P :: 3 : 1 : 0)

1. **Course number and name:** UEE845; Microcontrollers and Applications

2. **Credits and contact hours:** Credits: 3.5; Hours: 4

3. **Text book, title, author, and year**

- Ayala, K.J., *The 8051 Microcontroller Architecture, Programming and applications*, Penram International Publishing (India) Pvt. Ltd. (2007).
- Mazidi, M.A., *The 8051 Microcontroller and Embedded System*, Pearson Education (2008).
- Predko, M., *Customizing The 8051 Microcontroller*, Tata McGraw-Hill (2002).

a. Other supplemental materials

- Nil

4. **Specific course information**

a. Brief description of the content of the course (catalog description)

**Microcontroller an overview:** Introduction to 8 bit microcontrollers; Basic differences and similarities between Microprocessor and Microcontroller, Types of various architectures; Harvard and Von-Neumann, RSIC and CSIC, Concept of pipelining.

**Introduction to 8051 Microcontroller :** Intel 8051 history, Pin diagram of 8051, 8051-architecture, Registers, Timers Counters, Flags, Special Function Registers, DPTR, PC, PSW, SP etc. Additional features in 8052.

**8051 Assembly Programming - I:** Addressing Modes, Data types and Directives, Jump, Loop and Call instructions, Arithmetic instructions and their simple programming applications.

**8051 Assembly Programming – II:** Logic Instructions Single –bit instructions, Timer and Counter programming, Interrupts programming, Serial communication, Memory accessing and their simple programming applications.

**Hardware interfacing:** I/O Port programming, Bit manipulation, Interfacing to a LED, LCD, Keyboard, ADC, DAC, Stepper Motors and sensors.

**Introduction to Advanced microcontrollers:** Overview of Microchip PIC 16Fxxx, Motorola 680XX, ARM etc. and their comparison with 8051.

### **Laboratory Work**

Programming and Application development around 8051, Interfacing to LED, LCD, Keyboard, ADC , DAC , Stepper Motors and sensors etc.

5. **Specific goals for the course**

After the completion of the course, the students will be able to:

- Describe the concept of microcontroller architectures.
- Explain the addressing modes, data types and instruction set.
- Program microcontroller for different applications including hardware interfacing
- Explain the concept of advanced microcontrollers and latest trends.

6. **Brief list of topics to be covered**

- Introduction to 8051 Microcontroller
- 8051 Programming
- Hardware interfacing

- Introduction to Advanced microcontrollers