**Course Objectives:**

The objective of this course is to study the fundamentals of Microcontrollers and design of embedded systems by using various Microcontrollers. This course familiarize the students with the programming and interfacing of microprocessors and microcontrollers.

**Course Outcomes:**

- Understand the Architecture of Microcontrollers, Programming the Microcontrollers, interfacing various real data collection sensors to Microcontrollers and design and developing a prototype embedded systems using Microcontrollers.

**SKILLS:**

- Design a 8051 microcontroller based embedded system.
- To do case study experiences for microcontroller based Design synchronous and applications.
- Gain knowledge on ARM based system design.
UNIT - I
Overview of 8051


UNIT - II
ARM ARCHITECTURE & PROGRAMMING: ARM Design Philosophy, Registers, Program Status Register, Instruction Pipeline, Interrupt and Vector Table, ARM Processor Families. Instruction set: Data Processing Instructions, Addressing Modes, Branch, Load-Store instructions, PSR instructions, and Conditional instructions.

UNIT - III

UNIT - IV
ARM THUMB INSTRUCTION & PROGRAMMING: Thumb Instruction set: Register usage, Branch instructions, Data Processing Instructions, single-Register and Multi Register Load-Store instructions, stack, software Interrupt Instructions. Interrupts, Interrupt handling schemes.

UNIT - V
INTERFACING & APPLICATIONS: Interfacing of LCD, Seven Segment display, keypad, stepper motor, DC motor. Generating pulses like PWM for motor control, Sensors (Temp, Pressure, Humidity, etc) interfacing and data acquisition using ADC/DAC. Developing simple applications by using Zigbee, Bluetooth, GPS and GPRS Modules (Any Two)

TEXT BOOKS:

REFERENCE BOOKS:

List of Experiments (based on ARM cortex-M series)
1. Calculator type keyboard
2. 4-Digit,7-segment LED Display
3. Dual DAC
4. TXDR Interface Using PT100 with ADC
5. Stepper Motor
6. Elevator Interface
7. 4*4 Matrix Hex Keypad
8. Temp Sensor
9. 16 Channel 8-bit ADC
10. Logic Controller
11. Traffic Lights
12. Musical Tone Generator
13. Opto Isolated Input Interface
14. Opto Isolated Output Interface
15. DC Motor