CERTIFICATION PROGRAMS IN EMBEDDED SYSTEMS

PROGRAMMING & APPLICATION DEVELOPMENT

Section : EMBEDDED SYSTEMS

Duration : 3 months

Objectives :

On completion of this programme the participants will be able to

- *Programme the 8051 Microcontrollers*
- *Programme the PIC Microcontrollers*
- *Programme the AVR Microcontrollers*
- *Serial communication between Microcontrollers*
- *Setup a I^2C communication between Microcontrollers*
- *Programme the GSM modules*
- *Programme the GPS Modules*
- Programme the CAN bus
- Programme the Ethernet
- *Programme the Zigbee Modules*
- *Design Real time Embedded System applications*

Course Content:

Sl No	Theory	Practical
1	**Embedded C:** Basics: Fundamentals of C, Data types and constants, Simple & formatted I/O operations, Operators and expressions, loops. Functions, Arrays, Storage classes, Structures and Unions, Bit operations, Pointers and File Handling	Corresponding Practical
2	**8051 Microcontrollers Programming and Applications:** Introduction to 8051 Microcontrollers, Introduction to Keil Micro vision Software and ISIS Proteus Simulator, I/O Port Programming, 8051 Programming in C, 8051 hardware connections and Hex file creations, 8051 Timer/ Counter Programming in C, 8051 Serial Port Programming in C, Interrupt Programming in C,ADC/DAC 8051 Real world Interfacing: LED, LCD, Keypad, Sensors, Buzzer, Relay Interfacing	Programming the I/O Port of 8051 Programming the Timers of 8051 Programming the Interrupts of 8051 Programming Serial Communication for 8051 Programming to interface ADC with 8051 Programming to interface LCD with 8051 Programming to interface Keyboard with 8051 Programming to interface Sensor with 8051 Buzzer interfacing with 8051 Relay interfacing with 8051
3	**PIC Microcontrollers Programming and Applications:** Introduction to PIC Microcontrollers, Introduction to CCS PIC C and ISIS Proteus Simulator, Architectural overview, Memory organization, I/O Ports, Interrupts and Reset, Timers, Capture /	Programming to interface I/O Port of PIC Programming the Timers of PIC Programming the Interrupts of PIC Programming the Serial Communication for PIC Programming to interface LCD with PIC Programming to interface Keypad with PIC Programming to interface Sensor with PIC

	Compare / PWM Module Serial I/O , Analog to Digital conversion, AUSART, I2C, Power down modes.	Programming to interface ADC , DAC with PIC
4	**AVR Microcontrollers Programming and Applications:** Introduction to AVR Microcontrollers, Introduction to Code vision Software and ISIS Proteus Simulator, AVR Programming in C, AVR hardware connections and Hex file creations.	I/O Port Programming of Atmega16A Timer Programing of Atmega16A Interrupt Programming of Atmega16A Serial Communication for Atmega16A LCD interfacing with Atmega16A Keypad Interfacing with Atmega16A Sensor Interfacing with Atmega16A ADC Interfacing with Atmega16A
5	**User Peripherals:** General purpose I/O, Fast I/O Register, Interrupt port, General purpose Timers, Analog to Digital Converter, Digital to Analog converter, Real Time clock, PWM, Buzzer, Relay	Programme to interface LED,LCD, Keypad, Programme to interface Graphical LCD Programme to interface ADC, DAC with AVR Programme to interface RTC Programme to control motor using PWM Buzzer, Relay with AVR Microcontroller
6	**Motors:** DC motors, BO motors, Stepper motors, transformers, power supply circuits, relays, actuators	All modules interfaces
7	**Embedded Communication Modules and its applications:** RS232, RS485, UART, I2C	Programme to communicate using RS232 Programme to communicate using RS485 Programme to communicate using UART Programme to communicate using I2C
8	DTMF, GSM, GPS interfacing	Programming and interfacing GSM modules Programming and interfacing GPS modules
9	Zigbee transmitter and receiver, IR communication, Near Field Communication (NFC), Bluetooth basics	Programme to communicate using Zigbee Programme to communicate using(NFC), Programme to communicate using Bluetooth
10	SPI,RFID, Finger Print Reader, and USB basics	Programme to communicate using SPI Programme to interface RFID Programme to interface Finger Print Reader Programme to interface USB port
11	CAN and Ethernet fundamentals	Programming to communicate through CAN bus Programming to communicate through Ethernet
12	Joystick, Sensor -RGB, Flame, Heart Beat, Touch, Laser Emit, Temperature & Humidity.	All sensors interfaces