ANNEXURE I

COURSE NAME : EMBEDDED SYSTEMS AND INTERNET OF THINGS (IOT)

COURSE DURATION : 40 HOURS (**One Month)**

COURSE OBJECTIVE :

To give a brief idea about how to design an intelligent IoT based embedded system using different controller and sensor networks. The main intuition is to develop technical or hardware skills to design an embedded hardware.

COURSE OUTCOME :

Students will be able to understand how to write program to develop a smart embedded system using different programming language like C, Assembly, Arduino programming etc. in different platform like keil µ Vision, AVR studio, Arduino IDE etc. Students will also get a very clear knowledge to develop their own embedded system hardware in real time.

ELIGIBILITY : M.Sc. in Electronics/ B. Tech. / M. tech in Electronics/ B. Tech/ M. Tech CSE students.

PRE-REQUISITES (software required by the participants):

Software's
Proteus 7.0, Keil uVision5, AVR Studio, Arduino IDE, Nuvoton Software

Annexure-I

SL. No	Topic Covered
1.	Brief introduction to embedded system, Embedded system designing tools and software.
2.	Brief introduction to embedded system hardware and basics of electronics components.
3.	Brief introduction of 16x2 LCD, Interfacing of 16x2 LCD Arduino UNO/Nano.
4.	16x2 4bit and 8bit mode of operation, Interfacing of 8051 with 8051 controllers.
5.	Brief introduction to different communication standard-Serial communication, I^2C communication etc.
6.	Introduction to different communication module- ZigBee, Bluetooth etc.
7.	Brief introduction to ADC, ADC0804/0809, Interfacing of analog sensor with 8051 and Arduino.
8.	Introduction to GSM communication, different AT commands of GSM, Interfacing GSM with 8051 & Arduino

9.	9	Introduction to DC Motor, types, working of driver circuit, hay's bridge.
10.	10	Speed control of DC geared motor, Interfacing of DC motor with 8051 using LM293D driver
11.	11	Brief introduction to 7 segment display, interfacing of 7 segment display with 8051 and Arduino.
12.	12	Introduction to ultrasonic senor- HCSR04, working, interfacing with 8051 and Arduino.
13.	13	Brief Introduction to Hex keypad, interfacing with Arduino
14.	14	Interfacing of hex keypad with 8051 Brief introduction of digital sensor, Interfacing of DHT11 with Arduino.
15.	15	Interrupt and timer of 8051, Interfacing of DHT11 with 8051. Introduction to Internet of Things (IoT), tools and software to develop IoT based system. Introduction to IoT enable device/SoC, ESP8266, ESP32 etc.

Annexure-II

MINI PROJECTS

1. Design a magical lightning system using LED's and switch for festival. (Both in Arduino uno and 8051)
2. Design an automatic fire alarm system using OPAMP/Controller.
3. Design a visitor counter system for a hall using 16x2 LCD and PIR/IR sensor. (Both in Arduino uno and 8051)
4. Design a 3-phase fault detection and analysis system using 16x2 LCD. (Both in Arduino uno and 8051)
5. Design a weather status monitoring system using Zigbee and 16x2 LCD. (Both in Arduino uno and 8051)
6. Design a home automation system using Arduino and different sensor module.
7. Design an automatic fan speed controller system using LM35 and 16x2 LCD. (Both in Arduino uno and 8051)
8. Design a home automation system using GSM. (Both in Arduino uno and 8051)
9. Design a mobile control robot using Arduino and L293D/L298 driver.
10. Design a smart wheel chair for physically disable person using Arduino.
11. Write a program in Arduino and 8051 to display numbers in 7-segment display.
12. Design an obstacle avoiding robot using ultrasonic sensor module.
13. Write a program to interface a hex keypad with 8051/Arduino.
14. Design a password-based security system using 8051 & GSM.
15. Design a wireless system to measure humidity and temperature of air using Arduino.
16. Design a system to measure humidity and temperature of air using 16x2 LCD, DHT11 and 8051 controllers.
17. Write a program to develop a local server to dump data from real world.
18. Design an IoT based smart home automation system using ESP8266 controller.