Certificate Course
Title-ARDUINO System

Total Theory Lecture-12 Hours
Practical Session-18 Hours

Course Objectives:

1. To introduce the fundamental concepts of microprocessors and microcontrollers, focusing on 8085 and Arduino.
2. To provide students with hands-on experience using microcontroller development environments such as Arduino IDE and Atmel Studio.
3. To develop a thorough understanding of interfacing sensors and actuators, including infrared, ultrasonic, proximity, accelerometers, and gyroscopes.
4. To teach students how to control and interface various hardware components such as LEDs, buzzers, motors, and displays using Arduino.
5. To cultivate programming skills in Embedded C for developing embedded systems and real-world applications with Arduino.
6. To enable students to design and implement communication systems using Bluetooth and GSM modules.
7. To encourage practical application of theoretical knowledge by building embedded projects that combine sensors, actuators, and microcontrollers.

Course Outcomes (CO):

CO1: Demonstrate an understanding of microprocessors and microcontrollers, including their architecture and operational concepts.

CO2: Apply microcontroller programming skills using Arduino IDE and Embedded C to control hardware components effectively.

CO3: Interface a variety of sensors and actuators with Arduino to build functional embedded systems.

CO4: Design and implement embedded systems that include output displays like LCDs and seven-segment displays, as well as input devices such as switches and touchpads.

CO5: Demonstrate the ability to integrate communication modules, such as Bluetooth and GSM, with Arduino-based systems.

CO6: Develop and test embedded projects that involve motor control, sensor feedback, and real-time data processing.

CO7: Utilize programming and interfacing knowledge to solve practical problems in embedded system design through hands-on projects and applications.

Syllabus

Unit1

Introduction to Microprocessor: 8085, Intel, Bit/Byte, Memory, Number Systems Introduction to Microcontroller: Arduino, IDE, Software (Atmel studio), libraries, UNO, MEGA, Shield, motors.

Unit 2

LCD, touch pad Introduction to Sensors, Actuators: Infrared, Ultrasonic, Proximity, Sharp, Accelerometers and Gyroscope Programming with Arduino using basic components LED blink, Buzzer, DC motor, LCD display.

Unit 3

Arduino (Microcontroller)+Embedded C(Codding Language) +Sensors and Actuators (Peripherals)

Practical: -

1) LED blinking.
2) Interfacing of LCD to Arduino.
3) Interfacing of Bluetooth to Arduino.
4) Interfacing of Temperature sensor to Arduino.
5) Interfacing of servomotor to Arduino.
6) Interfacing of Buzzer to Arduino.
7) Interfacing of switch to Arduino.
8) Interfacing of GSM to Arduino.
9) Interfacing of seven segment Display to Arduino.