

Course Content & Syllabus Embedded System

Introduction of Embedded System

- Introduction to embedded system
- Applications of embedded system
- Need for embedded system
- Need for controller and compiler
- Architecture of embedded system

Introduction of Arduino

- What is Arduino
- History of Arduino
- Introduction to Arduino compiler
- Working in Arduino compiler
- Introduction to Arduino boards
- Arduino board configuration And needs
- Overview of Arduino Boards
- Arduino Uno Features
- Setting Up Arduino IDE

Microprocessor & Microcontroller Difference

- What are Microprocessor & Microcontroller?
- Basic Parts of Microprocessor and Microcontroller
- Difference between Microprocessor and Microcontroller
- Applications of Microprocessors and Microcontrollers
- AVR microcontroller ATMEGA168/328/8
- Pin diagram of ATMEGA 328

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Basics of C Language

- C programming basics format and Arduino format
- Introduction to boot-loader burning boot-loader
- If-else Statement
- For Loop
- While Loop
- Do-While Loop
- Switch Statement
- Infinite Loop and Interrupt Service Routine

Basic Electronic

- Current and Voltage
- Transistor
- Actuator
- Ohm's Law
- Resistors and Capacitors
- Voltage Divider Rule
- Diodes and Transistors
- Applications of Resistors, Capacitors, Diodes

Arduino Ide Introduction and Starting

- Introduction to I/O programming
- Pin Mode in AVR and variables
- Digital Output programming
- Operations and operators

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Arduino Syntax Programming

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- What is a Light Emitting Diode (LED)?
- Program for different LED patterns
- Applications
- Circuit Diagram of LED Interfacing with Arduino
- LED Interfacing with Arduino

Arduino Interfacing With Led and Project

- What is a Light Emitting Diode (LED)?
- Program for different LED patterns
- Applications
- Circuit Diagram of LED Interfacing with Arduino
- LED Interfacing with Arduino

Arduino Interfacing with Switch and Project

- Connecting a switch with microcontroller
- Using micro-switch interfacing (Programming)
- Modes of Connection
- Internal Pull Up Pull Down Resistors (Programming)
- Concept of input holding
- Checking release of buttons

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Arduino Interfacing with Motor & Driver

- Applications
- Various motors its need and applications
- H-Bridge
- DC Motor
- L293D
- Dc Motor: Introduction
- Configuration testing of Dc motor
- Modes of Working of Dc motor
- Application: Dc Motor Interfacing (Hardware Programming)
- Introduction to Libraries

Arduino Interfacing with Motor & Driver

- Relay Driving Circuit
- Circuit Diagram of Relay Driving Circuit
- Circuit Diagram of Relay & Interfacing with Arduino
- PWM Technique
- Application: Sample program for PWM at Analog pin (Programming)
- Application: Internal hardware for PWM in Arduino (Programming)
- Servo Motor: Introduction
- Servo Motor Interfacing (Hardware Interfacing)

Arduino Interfacing with LCD and Project

- What is an Alphanumeric LCD
- LCD 16X2: Introduction
- Application: Interfacing of display modules (Programming)
- Some command with LCD can use
- Application: LCD Interfacing (Text Display, Moving Text Display)(Programming)
- Vertical Scrolling in 16X2 Alphanumeric LCD
- Circuit Diagram of 16X2 Alphanumeric LCD Interfacing

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Arduino Interfacing with Keypad and Project

- Circuit Diagram of Switch Interfacing with Arduino
- Switch Interfacing with Arduino
- Application of Switch
- What is a Matrix Keypad?
- 4X4 Keypad Interfacing with Arduino and Serial Monitor
- 4X4 Keypad Interfacing with Arduino and LCD Display
- 4X4 Keypad based Password with Arduino and LCD Display

Arduino Interfacing with Sensors and Project

- Circuit Diagram of IR Sensor
- Circuit Diagram of Analog IR Sensor Interfacing with Arduino
- Application of IR Sensor
- Circuit Diagram of Light Sensor
- Circuit Diagram of Analog Light Sensor Interfacing with Arduino
- Gas sensor, pressure sensor, sound sensor etc.
- Application of Light Sensor

Arduino Interfacing with ADC

- Analog interfacing
- Concept of ADC
- Programming
- Programming analog sensors

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Arduino Interfacing with Serial Communication and Project

- What is a Communication Protocol?
- Serial and Parallel Communication
- Simplex, Half Duplex and Full Duplex Communication
- Universal Synchronous and Asynchronous Receiver and Transmitter (USART) Communication Protocol
- RF communication and applications
- RF Transmitter RF Receiver
- Application: Program of RF Controlled Robot using if/else conditions(Programming)
- Serial terminal control methods
- Getting input from serial terminal
- Sending data to input terminal
- Types of Interfacing- Serial Parallel
- Serial Communication: Introduction
- Serial Standard of computer RS232
- Configuring serial communication in Arduino
- Understanding blue-tooth
- Interfacing blue-tooth using Arduino
- Programming Application discussion
- Applications to brief the course(only codes and hardware logic)

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