Robotics Using Arduino - 1 Month Course

Course Title: Robotics Using Arduino

Duration: 1 Month (4 Weeks)

Prerequisites: Basic knowledge of electronics and programming (optional).

Week 1: Introduction to Arduino and Robotics

Day 1: What is Arduino? Basics of Robotics.

Understand the concept of robotics and the role of Arduino in robotics.

Day 2: Setting up Arduino IDE and Understanding Arduino Uno.

Install Arduino IDE, connect your board, and upload your first program.

Day 3: Basic Circuit Design (Blinking LED).

Learn how to design and simulate circuits to make an LED blink.

Day 4: Digital Input and Output (Push Buttons).

Understand digital I/O using push buttons to control LEDs.

Day 5: Basics of Sensors (IR, Ultrasonic).

Introduction to how sensors work and their applications in robotics.

Day 6: Controlling Servo Motor.

Learn to control the position of a servo motor using Arduino.

Day 7: Project: Automatic Night Lamp.

Build a night lamp that turns on automatically in the dark.

Week 2: Intermediate Arduino Projects

Day 8: Introduction to Motor Drivers (L293D).

Understand motor driver modules and their role in robotics.

Day 9: Controlling DC Motors.

Control the speed and direction of DC motors with Arduino.

Day 10: Line Following Robot: Basics.

Learn the fundamentals of building a line-following robot.

Day 11: IR Sensor for Line Following.

Implement IR sensors to detect and follow a line.

Day 12: Introduction to Bluetooth Modules.

Learn to control Arduino via Bluetooth communication.

Day 13: Controlling Robots via Bluetooth.

Create a basic robot controlled through a smartphone app.

Day 14: Project: Line Follower Robot.

Build and test a fully functional line follower robot.

Week 3: Advanced Features and Communication

Day 15: Introduction to LCD Displays.

Learn the basics of LCD displays and their applications.

Day 16: Interfacing LCD with Arduino.

Display messages and sensor readings on an LCD screen.

Day 17: Introduction to I2C Communication.

Learn about I2C protocol and how to use it for sensor communication.

Day 18: Reading Temperature and Humidity Sensors (DHT11).

Read environmental data using DHT11 and display it.

Day 19: Basics of Wireless Communication (RF).

Understand RF communication and its use in robotics.

Day 20: Obstacle Avoidance Robot: Basics.

Learn how to detect obstacles and navigate around them.

Day 21: Project: Obstacle Avoidance Robot.

Build a robot that avoids obstacles autonomously.

Week 4: Final Projects and Evaluation

Day 22: Introduction to IoT with Arduino.

Understand the integration of IoT in robotics using Arduino.

Day 23: Creating IoT-based Robots (Blynk App).

Build an IoT-enabled robot controlled through the Blynk app.

Day 24: Integration of All Components.

Combine sensors, motors, and communication modules.

Day 25: Designing a Final Robot (Your Own Design).

Plan and prototype your custom robot design.

Day 26: Debugging and Testing.

Troubleshoot and optimize your final robot project.

Day 27: Presentation Skills for Robotics Projects.

Learn how to effectively present your robotics project.

Day 28: Final Project Showcase and Feedback.

Demonstrate your robot and receive feedback for improvement.

Outcome: By the end of this course, participants will be able to design, build, and program basic to intermediate robots using Arduino. They will gain hands-on experience with sensors, actuators, and communication modules, as well as develop a final project to showcase their skills.