



Robotics Using Arduino – 4 Weeks

Duration: 4 Weeks | Mode: Hands-on Sessions + Projects + Deployment

Level: Beginner to Intermediate

Target Audience:

- ECE, EEE, Mechatronics & CSE Students
- Polytechnic & Diploma Students
- Robotics & Automation Club Members
- Tinkerers, Makers & DIY Enthusiasts
- Final Year Students building robot-based projects

WEEK 1: Introduction to Arduino & Basic Robotics Concepts

Topics:

- Overview of Robotics & Arduino
- Setting up Arduino IDE & Board
- Digital I/O: Controlling LEDs, Buzzers
- Reading Input: Buttons, IR Sensors, LDR
- Basics of Motor Control (DC Motor)

Lab Activities:

- LED Pattern Control
- Obstacle Detection using IR Sensor

Mini Task:

- Build a Line Indicator or Obstacle Warning System

WEEK 2: Motor Drivers & Movement Control

Topics:

- Motor Driver Modules (L293D, L298N)
- Controlling DC Motors & Gear Motors
- Servo Motor Basics & PWM
- Introduction to Robot Chassis Assembly
- Forward, Backward, Turn, Stop Logic

Lab Activities:

- Build your own 2-Wheel Robot
- Controlling Robot with Buttons or Switches

Mini Project:

- Basic Line Follower Robot (IR Sensor Based)

WEEK 3: Advanced Sensors & Wireless Control

Topics:

- Ultrasonic Sensor for Distance Sensing
- Bluetooth Module HC-05 Integration
- Smartphone-Controlled Robot (Using Android App)
- IR Remote Controlled Robot
- Speed Control with PWM

Lab Activities:

- Distance Measurement with Ultrasonic Sensor
- Build a Bluetooth Controlled Robot

Mini Project:

- Obstacle Avoidance Robot

WEEK 4: Smart Robot Projects & Final Demo

Topics:

- Sensor Fusion (Using Multiple Sensors)
- Smart Automation Concepts
- Battery Power Management for Robots
- Assembling & Testing Full Robot System
- Final Presentation & Demo

Lab Activities:

- Calibrating & Fine-tuning Robot Performance
- Modular Code Development

Final Project Options:

- Bluetooth + Obstacle Avoidance Combo Robot
- Smart Delivery Robot
- Voice-Controlled Robot (using Bluetooth + Android Voice App)
- Maze Solving Robot (Basic Logic)