NEXTLAYER
Upper edge of Excellence

Brochure

NextLayer is a future focused platform delivering top tier skill in Robotics, Design, and Emerging Technologies.

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DATE:
21st July 2025 to 26th July 2025

TIME:
10:30 AM to 1:30 PM

6 Day IoT & Robotics Hands-On Bootcamp

Duration: *6 Days*
Level: *Beginner-Friendly*
Mode: *Hands-on Learning*

Date: *21st July 2025 to 26th July 2025*
Time: *10:30 am to 1:30 pm*

Day 1

Introduction to IoT & Robotics

Theory

- What is IoT? What is Robotics?
- Understanding Microcontrollers (Arduino, ESP32)
- Components: Sensors, Actuators, Communication Modules

Hands-on

- TinkerCAD Simulation: LED blinking with Arduino
- Block Coding: LED control using a button
- Hardware Experiment: Setting up Arduino & LED blinking

Day 2

Sensors & Data Collection

Theory

- How Sensors Work (LDR, Ultrasonic, IR, Temperature, Humidity)
- Reading Sensor Data & Displaying It

Hands-on

- TinkerCAD Simulation: Using LDR & Ultrasonic sensors
- Block Coding: Displaying sensor values
- Hardware Experiment:
  - Detecting Light Levels with LDR
  - Measuring Distance with Ultrasonic Sensor

Day 3

Actuators & Motor Control

Theory

- Introduction to Actuators (Servo, DC Motor, Relay)
- Motor Drivers & PWM Control

Hands-on

- TinkerCAD Simulation: Servo Motor control
- Block Coding: PWM Speed Control of Motors
- Hardware Experiment:
  - Controlling a Servo Motor with Arduino
  - Line-Following Robot using IR Sensors

Day 4

IoT Communication & Cloud Integration

Theory

- What is IoT Communication? (WiFi, Bluetooth)
- Cloud Platforms for IoT (ThingSpeak, Firebase)

Hands-on

- TinkerCAD Simulation: IoT Cloud Data Sending
- Block Coding: Sending sensor data to the cloud
- Hardware Experiment:
  - Sending DHT11 Temperature Data to ThingSpeak
  - Controlling LED from a Web Dashboard

Day 5

Smart Automation & Robotics Control

Theory

- Smart Automation: How Robots Make Decisions
- Obstacle Avoidance & Navigation Basics

Hands-on

- TinkerCAD Simulation: Obstacle Avoidance Robot
- Block Coding: Bluetooth-Controlled Robot with MIT App Inventor
- Hardware Experiment:
  - Building an Obstacle Avoidance Robot
  - Bluetooth-Controlled Robot using Mobile App

Day 6

Mini Project Development (Guided)

Theory

- How to Build an IoT or Robotics Project
- Step-by-Step Guide to Mini Projects

Hands-on (Students choose one guided project to build)

- Smart Dustbin (Ultrasonic + Servo) - Opens automatically when someone comes near
- IoT-Based Fire Alarm (DHT11 + Buzzer + WiFi) - Alerts when temperature is high
- Bluetooth-Controlled Car (HC-05 + Motor Driver) - Controlled via a mobile app
- TinkerCAD Simulation: Testing circuits before building
- Hardware Experiment: Hands-on assembly and testing

Day 6

Final Project & Showcasing

Theory

- Final Touches on Projects
- How to Present a Technical Project

Hands-on

- Independent Project Development: Students create their own projects
- Showcasing: Each student presents their project & working demo
- Feedback & Certificate Distribution

Requirements

- **Hardware:** Arduino, ESP32, Ultrasonic Sensor, DHT11, IR Sensors, LDR, Servo Motor, DC Motor, Motor Driver, LEDs, Breadboard, Jumper Wires.
- **Software:** TinkerCAD, Arduino IDE.

Why This Bootcamp is Effective?

- **Hands-on with Simulations & Real Hardware**
- **Block Coding for Easy Learning**
- **Simple but Practical IoT & Robotics Projects**
- **Students Build & Present Their Own Project**