

Learn, Build, & Innovate with Next-Gen Tech



Workshop Series

Robotics and Electronics Essentials – Arduino Basics & Sensors
Smart Devices & Cloud – NodeMCU, Cloud, Mobile Apps
Future Innovators – Raspberry Pi, Python, MQTT

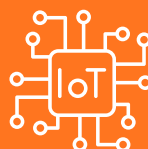
Step into the Future with Robotics & Electronics (ROE)!



Hands-on experiments from LEDs to Smart Homes



Learn Arduino, Raspberry Pi, Python, IoT Cloud & more



No prior knowledge required – beginner friendly!

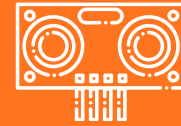


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ROE ESSENTIALS WORKSHOP



Kickstart your IoT journey with this beginner-friendly workshop! Learn how everyday devices become smart using sensors, microcontrollers, and wireless communication. No prior Knowledge needed – just curiosity and creativity!



**4 Days of
Workshop**



**4-5 Hours of
Fun Learning**



**100% hands-on
projects**

Day 1: Introduction to IoT & Arduino Basics

Topics:

- What is IoT? Real-world examples (smart homes, wearables, cities).
- Basics of Sensors & Actuators (input vs output).
- Arduino platform overview (board, IDE, coding).
- Introduction to Tinkercad (simulation for practice).
- Arduino Programming Fundamentals.

Projects/Experiments:

1. Simple LED Blink.
2. RGB LED color mixing.
3. Reading sensor values and displaying on Serial Monitor.

Day 2: Wireless Communication with Bluetooth

Topics:

- Introduction to wireless communication.
- Bluetooth basics – how phones communicate with microcontrollers.
- Connecting Arduino with HC-05 Bluetooth module.
- Using Android Bluetooth terminal app for control.

Projects/Experiments:

1. Controlling LED from Android phone.
2. Controlling motor/fan speed from Android Bluetooth app.
3. Controlling buzzer or multiple outputs.

Day 3: WiFi & Local Web Servers

Topics:

- WiFi vs Internet (local vs global connectivity).
- Introduction to ESP8266 WiFi module.
- Interfacing ESP8266 with Arduino.
- Hosting a local webpage with Arduino + ESP8266.

Projects/Experiments:

1. Arduino + ESP8266 → create a local hotspot.
2. Control various devices via webpage on phone.
3. Display sensor values on webpage.

Day 4: Final Project- Voice-Controlled Smart Home

- Students will create Voice-Controlled Smart Home to control home appliances.
- Linking voice input with Arduino through Bluetooth or WiFi.



ROE PROFICIENCY WORKSHOP



Take your IoT skills to the next level! Learn NodeMCU, cloud platforms, and mobile app building. Create smart projects you can control from anywhere using the internet. Just imagination required!



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Day 1 – NodeMCU Basics

Topics:

- Introduction to NodeMCU (ESP8266/ESP32) → features & why it's IoT-friendly.
- Setting up NodeMCU in Arduino IDE.
- Connecting NodeMCU to WiFi network.

Hands-On Experiments:

1. Blink LED using NodeMCU.
2. Read basic sensor data (Temperature, LDR, Motion).
3. Print sensor values on Serial Monitor.

Day 2 – Introduction to IoT Cloud

Topics:

- What is IoT Cloud? Why cloud is important in IoT.
- Introduction to IoT platforms
- Sending data from NodeMCU → Cloud.

Hands-On Experiments:

1. Upload sensor values (temperature, light, etc.) to IoT Cloud.
2. Visualize data in Cloud dashboard (graphs, charts, gauges).

Day 3 – Cloud to Device Control

Topics:

- Controlling devices through IoT Cloud.
- Linking Cloud dashboard with NodeMCU outputs.

Hands-On Experiments:

1. Control LED ON/OFF via Cloud (from mobile/PC).
2. Control multiple outputs (fan, buzzer, RGB LED).
3. Build a Mini Smart Switchboard on Cloud.

Day 4 – App Building + Final Project

- Introduction to MIT App Inventor.
- Designing simple IoT mobile apps
- Linking App with NodeMCU (via WiFi/Cloud).
- Students create their own Android mobile app to control home appliances.
- Adding voice control inside the app.



ROE INNOVATOR WORKSHOP



Master advanced IoT with Raspberry Pi, Python, and real-time communication. Build powerful projects, set up servers, and create a full-fledged computer system. From smart devices to automation!



**4 Days of
Workshop**



**4-5 Hours of
Fun Learning**



**100% hands-on
projects**

Day 1 – Raspberry Pi & Linux Basics

Topics:

- Introduction to SoC & Raspberry Pi
- Comparison: Arduino vs Raspberry Pi
- Linux basics: GUI vs CLI
- Understanding file system & Linux commands
- Introduction to SSH (remote access)

Hands-On Experiments:

1. Setting up Raspberry Pi (boot OS, configure basics)
2. Installing and running a simple server on Raspberry Pi

Day 2 – Python Programming for IoT

Topics:

- Why Python for IoT?
- Python basics: variables, loops, conditions, functions
- Using Python for GPIO control on Raspberry Pi
- Reading sensor values using Python scripts

Hands-On Experiments:

1. Blinking LED with Python
2. Reading sensor data (temperature/LDR) with Python
3. Automating output (turn fan/LED on based on sensor values)

Day 3 – MQTT and IoT Communication Protocols

Topics:

- Introduction to IoT communication protocols
- MQTT basics: Broker, Publisher, Subscriber
- Installing and configuring MQTT broker on Raspberry Pi
- Communication between Raspberry Pi & Arduino using MQTT

Hands-On Experiments:

1. MQTT Publish/Subscribe from Arduino → Raspberry Pi
2. MQTT Publish/Subscribe from Raspberry Pi → Arduino
3. Real-time sensor monitoring using MQTT

Day 4 – Final Project: Raspberry Pi as Full-Fledged Computer

Convert Raspberry Pi into a personal computer with working OS, apps, and peripherals (keyboard, mouse, monitor).

Why Choose This Workshop?

Hands-on learning with Arduino boards, sensors, and motors to build practical robotics and electronics skills.



1

Hands-on Arduino & Electronics: Work with boards, sensors, and motors to gain real skills

2

Practical Programming & Robotics: Write code, control devices, and apply learning through projects.

3

Build Real-World Projects: Create RGB lights, motors, sensor gadgets, and Bluetooth-controlled devices.

4

Guided Learning with Simulations: Practice safely with Tinkercad and expert step-by-step guidance.

ENROLL NOW

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