AMPUSH

AMPUSHWORKS ENTERPRISES PRIVATE LIMITED

Technical Training Programmes 2026–27

SYLLABUS

Internet of Things (IoT)

Course information	
Programme	1. Internet of Things (IoT)
Duration	One month
Total hours	102 hours (theory 32, practical 64, examinations 6)
Course fee	₹3,000 per candidate
Batch size	Minimum 10 candidates; batches scheduled after sufficient registrations
Eligibility	B.Tech, Diploma, ITI, B.Sc and BCA students, engineering graduates, working professionals and college faculty
Prerequisites	Basic knowledge of electricity and electronics. No prior programming experience is required, but basic computer skills are expected.

1. Course Introduction

This course introduces the complete chain of an Internet of Things system: sensing a physical quantity, processing it on a microcontroller, sending it over a network and viewing or acting on it from a cloud dashboard. The course is built around practical IoT applications such as irrigation and water-supply monitoring.

2. Course Objectives

On completing this course, candidates will be able to:

- Explain the architecture and building blocks of an IoT system
- Interface common sensors and actuators with a microcontroller
- Connect devices to the internet and send data to a cloud platform
- Build dashboards, alerts and remote control for an IoT application
- Apply basic security practices to IoT devices

3. Hours Distribution

Component	Hours
Theory classes (8 units × 4 hours)	32
Practical sessions (14 labs × 4 hours)	56
Mini project (practical)	8
Theory examination	2
Practical examination	4

Component	Hours
Total programme hours	**102**

Practical sessions including the mini project total 64 hours (56 + 8). The examinations (6 hours) are held after completion of the training.

4. Theory Syllabus (32 hours)

Unit	Topics covered	Hours
Unit 1	INTRODUCTION TO IOT • What IoT is and where it is used • IoT system architecture: device, network, cloud, application • Examples: smart irrigation, water supply, energy monitoring	4
Unit 2	ELECTRONICS FUNDAMENTALS FOR IOT • Voltage, current, power and safety • Breadboards, resistors, LEDs and transistors • Power supplies and batteries for devices	4
Unit 3	MICROCONTROLLERS FOR IOT • Arduino and ESP32 overview • Programming environment and first program • Digital and analogue inputs and outputs	4
Unit 4	SENSORS AND ACTUATORS • Temperature, humidity, soil-moisture and level sensors • Relays, buzzers and motors as actuators • Reading, calibrating and filtering sensor data	4
Unit 5	CONNECTIVITY • Wi-Fi basics and connecting an ESP32 • Overview of GSM and LoRa for remote sites • Choosing the right connectivity for an application	4
Unit 6	IOT PROTOCOLS AND DATA • HTTP and REST basics • MQTT: broker, topics, publish and subscribe • Data formats: JSON	4
Unit 7	CLOUD PLATFORMS AND DASHBOARDS • Sending data to a cloud platform • Building dashboards, charts and widgets • Alerts and remote control from a dashboard	4
Unit 8	IOT SECURITY AND APPLICATIONS • Common risks and good practices • Passwords, updates and secure connections • Case study: IoT-based irrigation and pump monitoring	4

5. Practical Sessions (64 hours)

Lab	Practical assignment	Hours
1	Blink an LED and read a push button	4
2	Read temperature and humidity and display on serial monitor	4
3	Soil-moisture sensor with threshold indication	4
4	Control a relay to switch a load	4
5	Connect an ESP32 to Wi-Fi	4

Lab	Practical assignment	Hours
6	Send sensor data to a web server using HTTP	4
7	Publish and subscribe with MQTT	4
8	Create a cloud dashboard with live readings	4
9	Remote on/off control of a load from a dashboard	4
10	Set up threshold alerts and notifications	4
11	Water-level monitoring with a level sensor	4
12	Log sensor data and view history charts	4
13	Basic device security: credentials and secure connection	4
14	Troubleshooting connectivity and sensor faults	4
MP	Mini project: IoT-based irrigation controller: soil-moisture sensing, automatic pump control and a cloud dashboard with remote override.	8
	Total practical hours	**64**

6. Mini Project

Project: IoT-based irrigation controller: soil-moisture sensing, automatic pump control and a cloud dashboard with remote override.

Each candidate (or small group) plans, builds, tests and documents the project during the final practical sessions, and presents it during the practical examination.

7. Hardware, Tools and Software

- Arduino and ESP32 boards
- Temperature, humidity, soil-moisture and level sensors
- Relay modules, LEDs and buzzers
- Breadboards, jumper wires and power supplies
- Laptop with programming software and a cloud IoT platform

8. Learning Outcomes

By the end of the course, candidates will be able to:

- Build a working IoT device from sensor to cloud dashboard
- Use HTTP and MQTT to send and receive data
- Configure alerts and remote control
- Plan an IoT solution for a simple real-world problem

9. Assessment and Certification

Examination	What is assessed	Duration
Theory examination	Understanding of concepts, components and principles covered in the 8 units	2 hours
Practical examination	Ability to build, wire, program, test and fault-find; presentation of the mini project	4 hours

Practical assignments completed during the course are also reviewed as part of the practical assessment.

A **training completion certificate** will be issued subject to successful completion of the programme and assessment requirements.

10. Enrolment and Contact

To enrol, send your name, mobile number, college or organisation, course and year, and the name of this programme to Ampushworks. You will be informed when your batch is scheduled.

Contact	Details
Address	Priyadarshi Nagar, Bhagwat Nagar, Patna, Bihar – 800026
Website	https://ampushworks.com
Registration form	https://www.ampushworks.com/training.html#register
Email	support@ampushworks.com
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Note: This syllabus may be updated by Ampushworks to reflect new technology and equipment. The syllabus issued at the start of a batch applies to that batch.