AMPUSH

AMPUSHWORKS ENTERPRISES PRIVATE LIMITED

Technical Training Programmes 2026–27

SYLLABUS

Arduino, ESP32 and ESP8266

Course information	
Programme	3. Arduino, ESP32 and ESP8266
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 electronics and basic computer skills.

1. Course Introduction

Arduino and ESP boards are the most widely used platforms for rapid prototyping. This course teaches how to build working circuits quickly, use libraries and modules, and add Wi-Fi connectivity using ESP32 and ESP8266 boards.

2. Course Objectives

On completing this course, candidates will be able to:

- Set up and program Arduino, ESP32 and ESP8266 boards
- Use digital and analogue I/O and common modules
- Use libraries to speed up development
- Connect ESP boards to Wi-Fi and build simple web servers
- Build complete prototypes

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
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	GETTING STARTED • Arduino, ESP32 and ESP8266 compared • Installing the IDE and board support • Structure of a sketch	4
Unit 2	DIGITAL AND ANALOGUE I/O • Digital inputs and outputs • Analogue inputs • PWM outputs	4
Unit 3	PROGRAMMING ESSENTIALS • Variables, conditions and loops • Functions and libraries • Serial monitor and debugging	4
Unit 4	SENSORS AND MODULES • Temperature, distance and motion sensors • Displays: LCD and OLED • Relays and buzzers	4
Unit 5	ESP32 AND ESP8266 FEATURES • Wi-Fi station and access point modes • Deep sleep and power saving • Pin limitations and good practice	4
Unit 6	WEB CONNECTIVITY • Simple web server on ESP • Controlling outputs from a browser • Sending data to online services	4
Unit 7	DATA LOGGING AND STORAGE • Storing data in memory and SD card • Timestamps with a real-time clock • Viewing logged data	4
Unit 8	PROTOTYPING AND UPDATES • From breadboard to prototype • Over-the-air (OTA) update basics • Testing and documenting a prototype	4

5. Practical Sessions (64 hours)

Lab	Practical assignment	Hours
1	First sketch: LED and serial output	4
2	Read buttons and control LEDs	4
3	Analogue sensor reading and mapping	4
4	Ultrasonic distance measurement	4
5	OLED or LCD display output	4
6	Relay control with a sensor trigger	4
7	ESP32 Wi-Fi connection	4
8	ESP32 as an access point	4
9	ESP32 web server to control a relay	4

Lab	Practical assignment	Hours
10	ESP8266 sending data online	4
11	Data logging to SD card with timestamps	4
12	Deep sleep and wake-up on ESP32	4
13	OTA update of an ESP32 program	4
14	Fault-finding in a prototype circuit	4
MP	Mini project: Wi-Fi smart switch with sensor monitoring: web-controlled relay, live readings and data logging.	8
	Total practical hours	**64**

6. Mini Project

Project: Wi-Fi smart switch with sensor monitoring: web-controlled relay, live readings and data logging.

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 Uno, ESP32 and ESP8266 boards
- Sensors, displays, relays and SD-card modules
- Breadboards, jumper wires and power supplies
- Laptop with Arduino IDE

8. Learning Outcomes

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

- Program Arduino and ESP boards confidently
- Build Wi-Fi enabled prototypes
- Log and display data
- Present a working prototype

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
Phone	+91 94702 13936
WhatsApp	+91 94702 13937

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.