AMPUSH

**AMPUSHWORKS ENTERPRISES PRIVATE LIMITED**

Technical Training Programmes 2026–27

**SYLLABUS**

# GSM, Wi-Fi and Wireless Communication

| Course information | |
|---|---|
| **Programme** | 4. GSM, Wi-Fi and Wireless Communication |
| **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 microcontroller programming (Arduino or ESP). |

## 1. Course Introduction

Many field devices must work where there is no wired network. This course covers the main wireless technologies used in remote monitoring and control, with particular focus on GSM, which is widely used in rural and field installations, along with Wi-Fi, LoRa, Bluetooth and RF modules.

## 2. Course Objectives

On completing this course, candidates will be able to:

- Explain how GSM, Wi-Fi, LoRa, Bluetooth and RF work
- Control GSM modules using AT commands
- Build SMS and call-based control systems
- Set up Wi-Fi and LoRa links
- Select the right wireless technology for an application

## 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 | WIRELESS COMMUNICATION BASICS<br>• Radio waves, frequency and range<br>• Licensed and unlicensed bands<br>• Comparing wireless technologies | 4 |
| Unit 2 | GSM AND GPRS<br>• How mobile networks work<br>• GSM modules and SIM cards<br>• Power supply needs of GSM modules | 4 |
| Unit 3 | AT COMMANDS<br>• Command structure and responses<br>• Network registration and signal strength<br>• Sending and reading SMS | 4 |
| Unit 4 | SMS AND CALL-BASED CONTROL<br>• Remote switching by SMS<br>• Missed-call control<br>• Status reports and alerts by SMS | 4 |
| Unit 5 | WI-FI NETWORKING<br>• Wi-Fi standards and modes<br>• Connecting devices to a router<br>• Range and reliability | 4 |
| Unit 6 | LORA COMMUNICATION<br>• LoRa principles and range<br>• Point-to-point links<br>• Use in agriculture and utilities | 4 |
| Unit 7 | BLUETOOTH AND RF MODULES<br>• Bluetooth basics and pairing<br>• RF modules such as nRF24L01+<br>• Choosing modules for short-range links | 4 |
| Unit 8 | ANTENNAS AND SYSTEM DESIGN<br>• Antenna types and placement<br>• Signal testing in the field<br>• Designing a reliable remote-control system | 4 |

## 5. Practical Sessions (64 hours)

| Lab | Practical assignment | Hours |
|---|---|---|
| 1 | Power up a GSM module and check network | 4 |
| 2 | Basic AT commands and signal strength | 4 |
| 3 | Send an SMS from a microcontroller | 4 |
| 4 | Read and parse incoming SMS | 4 |
| 5 | SMS-based relay control | 4 |
| 6 | Missed-call based control | 4 |
| 7 | SMS status report on request | 4 |
| 8 | Connect an ESP32 to Wi-Fi and test range | 4 |
| 9 | LoRa point-to-point link | 4 |

| Lab | Practical assignment | Hours |
|---|---|---|
| 10 | LoRa sensor data transmission | 4 |
| 11 | Bluetooth control from a mobile phone | 4 |
| 12 | nRF24L01+ wireless link | 4 |
| 13 | Antenna placement and signal comparison | 4 |
| 14 | Troubleshooting a wireless link | 4 |
| MP | Mini project: GSM-based remote motor control: SMS and missed-call control with status and fault alerts by SMS. | 8 |
| | **Total practical hours** | **64** |

## 6. Mini Project

**Project:** GSM-based remote motor control: SMS and missed-call control with status and fault alerts by SMS.

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

- GSM modules (for example SIM800L, A7670C) with SIM cards
- ESP32, LoRa (Ra-02 / E32), Bluetooth and nRF24L01+ modules
- Antennas and power supplies
- Relay modules and a test motor or lamp

## 8. Learning Outcomes

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

- Use AT commands to control GSM modules
- Build SMS and call-based control systems
- Set up Wi-Fi, LoRa, Bluetooth and RF links
- Choose suitable wireless technology for a field application

## 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.*