IoT Intermediate level

Curriculum

Tabel Of Content

Module 1: IoT System Architecture

- Review of IoT basics
- IoT system components
- Device → Gateway → Cloud → Application
- Real-world IoT architecture examples

✅ Activity: Design an IoT system flow diagram

Module 2: Advanced Microcontroller Programming

- ESP32 pin modes & interrupts
- Timers and PWM
- Memory and performance basics
- Structured coding practices

✅ Hands-on: PWM-based motor/LED control

Module 3: Multi-Sensor Integration

- Reading multiple sensors simultaneously
- Sensor calibration and accuracy
- Data filtering basics
- Combining sensor data

✅ Hands-on: Multi-sensor monitoring system

Module 4: IoT Communication Protocols

- HTTP vs MQTT
- Basics of REST APIs
- Publishing & subscribing data
- Introduction to MQTT brokers

✅ Hands-on: Sensor data via MQTT

Module 5: Cloud Platforms & Dashboards

- IoT cloud concepts
- Using Blynk / ThingSpeak / Firebase
- Creating dashboards
- Data logging & visualization

✅ Hands-on: Live IoT dashboard creation

Module 6: Mobile & Web-Based Control

- Mobile app control (Blynk)
- Web dashboard basics
- Device state monitoring
- Secure remote access basics

✅ Hands-on: App-controlled automation system

Module 7: Automation & Control Systems

- Rule-based automation
- Threshold-based triggers
- Time-based automation
- Event-driven systems

✅ Hands-on: Automated alert & control system

Module 8: Data Handling & Analysis

- IoT data types
- Data storage concepts
- Trend analysis basics
- Understanding IoT insights

✅ Hands-on: Sensor data analysis on cloud

Module 9: Mini Projects (Intermediate Level)

- Students work on real-world IoT applications such as:
- Smart Home Automation System
- Smart Water Level Monitoring
- Smart Parking Prototype
- Environment Monitoring Station
- IoT-based Security Alert System

🧠 Core Skills Developed

- IoT system design thinking
- Cloud integration skills
- Multi-sensor handling
- Automation logic building
- Data visualization
- Team collaboration

🏆 Learning Outcomes

By the end of the program, students will:

- Design complete IoT systems
- Integrate multiple sensors & actuators
- Build cloud-connected applications
- Automate real-world processes
- Develop intermediate-level IoT projects

📜 Certification

- **BotNest IoT Beginner Program Certificate**
- **Project-based assessment**