Syntho Quest

INTERNET OF THINGS COURSE

Prepared By (CTO) SYNTHOQUEST

45 Days Duration

Duration: 45 days × 2 hrs/day = 90 hrs

Goal: Equip learners with the knowledge and hands-on skills to build IoT devices, integrate sensors, process data, and implement IoT solutions.

Core Domains

1. **Introduction to IoT (5%)**
   - IoT definition, history, and applications
   - IoT architecture: perception, network, processing, application layers
   - IoT vs M2M (Machine to Machine)
2. **Hardware Components & Sensors (10%)**
   - Microcontrollers: Arduino, Raspberry Pi
   - Sensors and actuators: temperature, humidity, motion, light, gas
   - Actuator interfacing and control
3. **IoT Communication Protocols (10%)**
   - MQTT, CoAP, HTTP, HTTPS
   - LoRa, Zigbee, NB-IoT, Bluetooth, Wi-Fi
   - Data transmission and network topologies
4. **Embedded Programming & Microcontrollers (15%)**
   - Arduino programming (C/C++) basics
   - Raspberry Pi programming (Python) basics
   - GPIO, PWM, I2C, SPI interfacing
5. **IoT Data Management (10%)**
   - Collecting sensor data
   - Data storage options: local, cloud, time-series databases
   - Data preprocessing, filtering, and visualization
6. **IoT Cloud Platforms (15%)**
   - AWS IoT, Azure IoT Hub, Google Cloud IoT
   - Device registration, telemetry, and command & control
   - Integration with dashboards for monitoring
7. **IoT Security & Privacy (10%)**
   - Authentication & authorization
   - Data encryption and secure transmission
   - Threats, vulnerabilities, and mitigation strategies
8. **Edge Computing & Analytics (10%)**
   - Edge vs cloud processing
   - Real-time analytics at the edge
   - Use of lightweight ML models on devices
9. **IoT Projects & Best Practices (15%)**
   - Smart home, smart agriculture, industrial IoT use cases
   - End-to-end IoT project: sensor → network → cloud → dashboard
   - Documentation, version control, and deployment

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