Short Term Courses-NIELIT Gangtok Centre

Certificate Course in Internet of Things (IoT) Using Arduino

Objective of the Course:

This Course focuses on hands-on IoT concepts such as sensing, actuation and communication. It covers the development of Internet of Things (IoT) prototypes—including devices for sensing, actuation, processing, and communication—to help you develop skills and experiences. The Internet of Things (IoT) is the next wave, world is going to witness. Today we live in an era of connected devices and the future is of connected things.

Learning Outcome:

After the completion of the course, the students will be able design some IoT based prototypes

Duration of the Course: 1.0 Month (without project)/1.5 Months (with project)

Minimum Eligibility Criteria:

Pursuing/Passed BE/B.Tech/MCA/BCA/BSc/MSc/Polytechnic Diploma/ NIELIT 'O' Level with graduation/ NIELIT 'A' Level

COURSE OUTLINE

Sr. No.	Modules to be Covered
1	Introduction to IoT
2	Arduino Simulation Environment
3	Sensor & Actuators with Arduino
4	Basic Networking with ESP8266 Wi-Fi module
5	IoT Protocols
6	Cloud Platforms for IoT

Detailed Course Syllabus:

1. **Introduction to IoT**
   - Understanding IoT fundamentals
   - IoT Architecture and protocols
   - Various Platforms for IoT
   - Real time Examples of IoT
   - Overview of IoT components and IoT Communication Technologies
   - Challenges in IOT

2. **Arduino Simulation Environment**
   - Arduino Uno Architecture
   - Setup the IDE, Writing Arduino Software
   - Arduino Libraries
   - Basics of Embedded C programming for Arduino
   - Interfacing LED, push button and buzzer with Arduino
   - Interfacing Arduino with LCD

3. **Sensor & Actuators with Arduino**
   - Overview of Sensors working
   - Analog and Digital Sensors
   - Interfacing of Temperature, Humidity, Motion, Light and Gas Sensor with Arduino
   - Interfacing of Actuators with Arduino.
   - Interfacing of Relay Switch and Servo Motor with Arduino

4. **Basic Networking with ESP8266 WiFi module**
   - Basics of Wireless Networking
   - Introduction to ESP8266 Wi-Fi Module
   - Various Wi-Fi library
   - Web server- introduction, installation, configuration
   - Posting sensor(s) data to web server

5. IoT Protocols

- M2M vs. IOT
- Communication Protocols

6. Cloud Platforms for IOT

- Virtualization concepts and Cloud Architecture
- Cloud computing, benefits
- Cloud services -- SaaS, PaaS, IaaS
- Cloud providers & offerings
- Study of IoT Cloud platforms
- ThingSpeak API and MQTT
- Interfacing ESP8266 with Web services

7. Project