

## **Certificate Course in Internet of Things (IoT) Using Raspberry Pi**

### **Objective of the Course:**

This course elucidates concepts related to Internet of Things. The students will get hands-on experience in working with Raspberry Pi 3 and exploring IoT.

### **Learning Outcome:**

After completion of the course, students will be able to understand the working of Raspberry Pi, its features and how various components can be used with Pi. The students will be able to understand IoT practically.

**Duration of the Course:** 1 Months (without project)/1.5 Months (with project)

**Minimum Eligibility Criteria:** Pursuing BE/B. Tech (CS/IT/EEE/ECE)/ MCA/ BCA/ BSc/MSc / Polytechnic Diploma/ NIELIT 'O' Level with graduation/ NIELIT 'A' Level

### **COURSE OUTLINE**

<b>Sr. No.</b>	<b>Modules to be Covered</b>
1	Overview of IoT
2	Getting started with Raspberry Pi
3	Bootting up RPi- Operating System and Linux Commands
4	Working with RPi using Python and Sensing Data using Python
5	C Language- Imbibing RPi with C
6	IoT using Raspberry Pi

# **Detailed Course Syllabus:**

## **1. Overview of IoT**

- Understanding IoT fundamentals
- IoT Architecture, protocols
- Various Platforms for IoT
- Real time Examples of IoT
- Overview of IoT components and IoT Communication Technologies

## **2. Getting started with Raspberry Pi**

- Introduction to Raspberry Pi
- Comparison of various Rpi Models
- Understanding SoC architecture and SoCs used in Raspberry Pi
- Pin Description of Raspberry Pi
- On-board components of Rpi
- Projects using Raspberry Pi

## **3. Booting Up RPi- Operating System and Linux Commands**

- Linux- Introduction, Architecture, File System
- Raspbian O.S.- Introduction, Tools
- Installing Raspbian on Pi
- First boot and Basic Configuration of Pi
- Popular Linux Commands

## **4. Working with RPi using Python and Sensing Data using Python**

- Introduction, Python vs. Other Languages, Applications of Python
- Understanding Python, Interpreted Languages
- Variables, Keywords, Operators and Operands
- Data Types in Python, Importing Libraries
- Flow Control, Conditional Statement, Loops
- Sensors Interfacing- Temperature and Humidity Sensor (DHT11), Motion Sensor (PIR), Obstacle detection using Ultrasonic sensor, etc.
- Communicating using RPi- GSM interfacing, Accessing on-board Wi-Fi
- Connecting Database with RPi

## **5. C Language- Imbibing RPi with C**

- C Basics- compiled language
- C Concepts- data types, variables, conditional statement, loops
- Library installation
- Compiling C programs
- Using Wiring Pi for GPIO Programming
- Interfacing Rpi using C

## **6. IoT Design using Raspberry Pi**

- IoT Applications based on Pi
- LAMP Web-server
- GPIO Control over WebBrowser
- Creating Custom Web Page for LAMP
- Communicating data using on-board module
- Home automation using Pi
- Node-RED, MQTT Protocol
- Using Node-RED Visual Editor on Rpi

## **7. Project**