Short Term Courses-NIELIT Delhi Centre

Certificate Course in

IOT (Internet of Things)USING RASPBERRY PI

Course Objective:

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, the students will be able to understand the working of Raspberry Pi, its features and how various components can be used with Pi..

Duration (In Hours): 80(With Project)/60 hrs

Minimum Eligibility : Pursuing/Passed BE/B.Tech/BCA/BSc/NIELIT 'O' Level with graduation/NIELIT 'A' Level

Fees (INR): Rs. 9,000/- for 60 hrs and 10,000/- for 80 hrs (+GST as applicable)

Prerequisite: Basic Knowledge of C or any other programming language.

COURSE OUTLINE

Sr. No.	Module	Duration (in Hrs)
1	Overview of IoT	5
2	Getting started with Raspberry Pi	5
3	Booting Up RPi- Operating System and Linux Commands	6
4	Working with RPi using Python and Sensing Data using Python	16
5	C Language- Imbibing RPi with C	12
6	IoT using Raspberry Pi	16
	Theory	30
	Practical	30
	Mini Project(For 80 hrs)	20
	Total	60/80

References:

1. Raspberry Pi Cookbook by Simon Monk
http://www.stilson.net/documentation/raspberrypi/Raspberry%20Pi%20Cookbook.pdf

2. The official raspberry Pi Projects Book
https://www.raspberrypi.org/magpi-issues/Projects_Book_v1.pdf

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 like Leafpad Editor**
- **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 Conecpts- datatypes, 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 Web Browser**
- **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. Mini Project