Internet of Things- 6 month Industrial Training

(4 hours a Day)

1. **A) Programming concepts :-**

   C Programming(8 days) (7/1/19----16/1/19)
   Introduction to Linux OS and working Environment, Overview of Embedded C, Pointers, Functions ,Arrays, Strings, Structures

2. **Basics of IoT (3 days) (17/1/19----21/1/19)**
   Definition of "Internet of Things", Evolution of IoT, Requirements and societal Impact of IoT, Concepts and Terminology of The Internet of Things (IoT), IoT Building Blocks, Embedded Systems in IoT and the interaction between software and hardware in an IoT device, IoT Enabling technologies, Role of operating system to support software in an IoT device, Applications of IoT, Challenges in IoT.

   1. **B) Python (7 days) (22/1/19----30/1/19)**
   Introduction to Python, Scope, Data Types, Control Flow, Functions, Modules & Packages, Standard Libraries, Data Structures, File Handling

3. **IoT Communication and Network Protocols (31/1/19-------1/2/19) (2 days)**
   IOT Communication Requirements, use of networking and basic networking hardware, Communication models and Data exchange formats, TCP/IP Protocol stack , IPv4 & IPv6 basics

   (4/2/19 ------08/2/19) (5 days)
   M2M in IOT, Communication standards, **,** overview of Link, IP Layers, TCP,UDP Protocols & Socket Programming, Network layers L2 &L3, Apples Bonjour protocol, Overview of mDNS, IOT Protocols(MQTT, CoAP, HTTP, REST, Web Sockets) , Wireless Protocols (Wi-Fi, Bluetooth, BLE)

4. **Introduction and interfacing with Wi-Fi certified IoT kit TI CC3200 (10 hrs theory & 70 hrs practical) (4 weeks) (11/2/19------8/3/19)**
   Introduction to the **CC3200MOD Launchpad**, GPIO interfacing, Peripheral Programming (UART, ADC, SPI, I2C, On-board and External Sensor Interfacing, GPS, GSM, Bluetooth, Stepper motor)

1.C) Core Java (8 days) (11/3/19-----22/3/19) (2 weeks)

Data Types, Operators, Control Statements, Classes and Methods, Constructor, Inner Classes and Inheritance, Interface and Package, Exception Handling, String Handling, Collection Framework, Multi-Threading, Event Handling, AWT,File Handling , JDBC

5. **Mobile and Web application Development(20 hrs theory & 60 hrs practical)(4weeks): (25/3/19-----12/4/19) (2 weeks)**
   Introduction to Android Platforms, Architecture, Application formats, life cycle, Design and Development of Mobile user Interfaces, And Mobile application Development, Connectivity in Android(Wi-fi, Bluetooth, BLE, GSM)Cross platform applications , Building applications from source code, Web Services, SOAP vs. REST Frameworks& Designing REST APIs for device registration

   (15/4/19-------26/4/19) (2 weeks)
   Templates designing using HTML , CSS Java Script and development using PHP, Data Management MYSQL, Data Visualization, Dashboard Design

6. **IoT Development (10 hrs theory and 60 hrs pratctical) (2 weeks) (29/4/19------10/5/19)**
   Introduction to **SimpleLink CC1310 LaunchPad** kit and **SimpleLink MSP432P401R LaunchPad**. Data transfer by Wireless/Wired connectivity, Working with cloud servers (IBM, Exosite, Temboo, Nexmo, Twilio, ThingSpeak, AT&T, PubNub) , Sensor data acquisition and pushing the sensor data (Moisture, Temperature, Ultrasonic, sound, light etc) over the cloud, Application development using SMS/ Email / Call Alert creation, Map visualization, Weather information etc. Introduction to Contiki OS and Open Wrt

7. **IoT Security (20 hrs) (1 week)(13/5/19--------17/5/19)**
   Ethical Challenges in IoT, Security and Interoperability, Modes of Attacks, Security Techniques and their implementation**.**

8. **Case Studies and IoT Project (120 hrs) (20/5/19 -----5/7/19)**

Eligibility:- B.Tech 3rd/Final Year students of CSE /IT/Electronics/ECE or equivalent

Prerequisites:- The participants are expected to have a basic knowledge of microprocessors/ Microcontrollers and any programming language.

Evaluation/assessment:- Written & Practical Assessment at the end of each module
(40:60- Theory : Practical)