IOT
(INTERNET OF THINGS)
Introduction
- What is IOT- In Depth Explanation
- Concepts and Technologies behind Internet of Things (IOT)
- The Past, Present, and Future of IOT
- Scope of IOT in India
- How large is the IOT Market in Different Domain
- Different skills required to become an IoT developer

IOT service Providers
- IBM Bluemix server introduction
- IBM Watson IOT platform
- IOT app development using IBM Watson

IOT Architecture
- IOT Network Architecture
- IOT Device Architecture
- IOT Application Architecture
- IOT cloud Architecture

IOT Device Design
- Sensors – Classification & selection criteria based on nature, frequency, and amplitude of signal
- Embedded Development Boards – Arduino, Raspberry Pi
- Interfacing peripherals & Programming GPIOs – Input/output peripherals, Sensor modules
- Design Considerations – Cost, Performance & Power Consumption tradeoffs

Getting started with Raspberry pi
- Introduction to Raspberry pi
- Raspberry pi different model comparison
- Raspberry Pi operating system choices
- Set up your Raspberry pi
- Raspbian OS

Raspberry pi vs Arduino
- Introduction To Arduino Platform
- Advantages of Raspberry pi over Arduino

Hands on session on Raspberry pi using Linux OS commands
- Introduction
- Linux vs other Operating system
- Linux basic commands
- Installation of packages
- Linux File handling
- Software installation on Linux

Remote Access to Raspberry pi
- Remote Access using SSH
- Remote Access using TightVNC

Programming Languages
- C/C++
- Embedded C
- Python
Practical session on Python Programming Language

- Program using Loops
- Program using function
- Python Libraries
- Oops concept in Python
- Hardware interfacing with python
- Exception Handling in Python
- Web connectivity with python
- Data storage in Python

**Embedded system with Raspberry pi**

- Introduction to Embedded system
- Embedded system basic block diagram
- Difference between Microprocessor and Microcontroller
- Key points for Choosing the Right Microcontroller
- Using Raspberry Pi in Embedded System
- Raspberry pi GPIO interfacing
- Led Interfacing with Raspberry pi using python
- Switch counter project using python
- DC Motor Interfacing with Relay
- H-Bridge Circuit
- Working of L293D
- PIR sensor interfacing with raspberry pi
- DHT22/11 sensor interfacing with Raspberry pi

**IOT Communication Protocols**

- Wired Communication Protocols – UART, USART
- Wireless Communication Protocols – Bluetooth, Wi-Fi
- Networking Protocols – OSI Reference Model, TCP/IP, Ethernet
- Application Protocols – HTTP, Web sockets, MQTT

**Cloud Computing**

- Overview of Computing
- Different types of computing
- Concept of cloud computing
- Architecture of Cloud
- Description on IaaS, PAAS, SAAS
- Top Cloud service providers
- Role of Cloud Computing in IOT
- Tools, API and Platform for integration of IOT devices with Cloud
- CloudFoundry

**IBM Bluemix - Cloud server for IOT**

- Introduction to IBM Watson
- Python project Deployment using cloud
- Twitter Feed analysis using Bluemix cloud
- Gmail analysis using Bluemix cloud
- Register Raspberry pi with IBM Watson IOT platform
- Create and Deploy IOT app with Bluemix Cloud Foundry
- Connecting real Devices with IBM Watson IOT
• Visualize and Analyze Sensor data with IBM Watson IOT

**Getting Started with Node-Red**

• Node-Red description

**The Node-RED programming model**

• Node-Red Examples with Cloud Platform
• Node-red Basic flow with Hello world
• Node red Weather Station
• Node red Twitter analysis
• Node-Red Using Raspberry pi and IOT Watson
• Controlling Led using Twitter feed