

# **Internet of Things Course Outline**

## **Fundamentals of Internet of Things (IoT)**

### **1.0 Overview of Setting up IoT Workflow and how to gather Data**

- 1.1. Introduction to IoT
- 1.2. Raspberry Pi and Arduino.
- 1.3. Sensing with Arduino.
- 1.4. Sensing and data gathering with Raspberry Pi.

### **2.0 IoT Protocols and Sensor Network Overview**

- 2.1 Creation of wireless sensor networks using Node MCU.
- 2.2 Implementation of MQTT broker and publish/ subscribe model.
- 2.3 Connect devices with MQTT protocol.
- 2.4 Setup Node Red service in Raspberry Pi
- 2.5 Visualize sensor data using Node Red
- 2.6 Posting sensor data in tweeter using node red.
- 2.7 Posting sensor information in email using node red.
- 2.8 Logging sensor information in database.

### **3.0 Cloud Architecture and communication with cloud**

- 3.1 Interacting with IBM Watson cloud.
- 3.2 Python based data visualization.
- 3.3 Introduction to MQTT-SN and Python Paho MQTT client.
- 3.4 Fundamentals of Mongo DB cloud access.
- 3.5 Fundamentals of AWS EC2 instance and AWS IoT platform

### **4.0 IoT based smartcity application**

- 4.1 Cupcarbon simulation environment
- 4.2 Introduction to OMNET++ Simulation environment
- 4.3 Fundamentals of Internet of Drones