

## IOT COURSE CONTENT

### Prerequisites:

Laptop / System with windows 64bit.

Fast internet facility Wifi/LAN for IoT based projects.

### INTRODUCTION TO IOT:

- What is Internet of Things?
- Getting started with IoT
- Introduction to Internet of Things (IoT)
- Why as IOT?
- How IOT became 21<sup>st</sup> Century Hottest Topic
- How Internet of Things works
- How Things Talk to Internet
- M2M towards IoT-the global context
- IoT Job Market
- Skills required to switch career to IoT
- Industries working on IoT
- IoT Products by Indian Companies
- Internet of Things in Indian Universities Curriculum
- Applications of IoT over Robotics, Marketing, Governance, Manufacturing
- Security Concerns in IoT
- IoT Hardware Requirements
- Comparison of Arduino Uno, Arduino Yun, Raspberry Pi, Beaglebone Black, Intel Edison & Galileo

### IOT ARCHITECTURE

#### ESP8266 Node-MCU: Hardware Introduction

- What is ESP8266 node-MCU
- Hardware Knowledge
- Hand Shake with ESP8266
- Developing the Environment
- Overview about the board

#### PIN Diagram

- Introduction to PIN Diagram
- PIN Outputs and PIN Inputs
- Feature that makes it different
- Analog and Digital Pinout

## SETTING UP THE IDLE FOR NODEMCU CONTROLLING THE DIGITAL OUTPUT ENVIRONMENT

- *Working:* Going its details
- Types
- Programming LEDS
- Making Circuits on Breadboard & Glowing Patterns

## SENSORS

- What is Sensor?
- How Sensors works?
- Knowing your sensors
- Interfacing Elements: PINS & Values

## INTERFACING various SENSORS: DHT11, Proximity Sensor Network Layers & IoT Protocols

- **Transport Layer Protocols**
  - TCP
  - UDP
- **IOT Application Layer Protocols**
  - HTTP
  - MQTT
- **Getting started with MQTT**
  - MQTT v/s HTTP
  - Understanding publish Subscribe Model
  - Using eclipse.org as a MQTT broker
  - Using secure MQTT Broker – io.adafruit.com
  - Publishing data to the broker
  - Subscribing data on a topic

## NODE RED

- Introduction to Node-red and node.js
- Installing node-red on windows
- Installing Serial port, ThingSpeak node and IBM Watson node
- Basic flow in node-red
- Twitting Sensor data on Twitter
- Sending Sensor data to Gmail Account

## **IOT Based HOMEAUTOMATION**

- Creating Webpage Button
- Adding up required WEBPGE Elements
- Controlling Devices

## **INTERACTING WITH CLOUD:**

- Cloud Architecture
- Popular Cloud Computing Services for Sensor Management.
- Connecting ESP8266 to Cloud
- Interacting with Physical world
- Monitoring Sensor Data
- Sending sensor data to Cloud using HTTP Protocol

**WEBSERVER:** Creating Webserver & Monitoring Environment Data

**INTRUDER NOTIFICATION:** Email the notification using various sensor

## **IOT WITH MQTT PROTOCOL**

- What is MQTT
- MQTT Protocol Architecture
- Writing up MQTT program using MQTT Client & Broker
- Publish the Messages using MQTT Protocol

## **PRACTICALS & PROJECTS:**

- Setting up the IDLE
- LED Interfacing using GPIO
- Integrating Sensors & Reading Environmental Physical Values.
- **Sensor Interfacing:**
- Proximity Sensor, Temperature & Humidity Sensor
- Live Temperature & Humidity Data Monitoring
- Creating Temperature & Humidity Local Webserver.
- Creating WebApp for IOT
- Sensor Controlled Home Automation
- **Live Temperature Feed on Webserver**
- **Being Social:** Sensor tweeting data on Twitter
- Alert Message sending to the mail
- Data from Environmental Sensors to Cloud Server.
- **Intruder Detection: Sending Email/SMS Notification**
- **Smart Home Application: Controlling Home Appliances from any part of the World**
- **Smart City: Smart Waste Management System Prototype**

**KIT CONTENT:**

- ✓ ESP8266 Node MCU
- ✓ Micro USB
- ✓ LED
- ✓ Buzzer
- ✓ DHT11 Sensor
- ✓ Proximity Sensor
- ✓ Relay Module
- ✓ Breadboard
- ✓ Male to Male Wire
- ✓ Male to Female Wire