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- Introduction to Internet of Things
- Internet of Things
- IoT Hardware Architecture
- IoT Protocol Architecture
- IoT Security
- IoT Sensor and applications
- Sensor use cases
- MQTT, HTTP, CoAP & XMPP
- Analyzing the industrial requirements
- IoT Hardware Requirements
- Sigfox
- Near Field Communication
- Node MCU Uno Introduction
- Pin Configuration and functionalities
- Programming with Node MCU
- LED Interfacing with Node MCU
- Serial Communication
- Introduction to basic sensors
- Interfacing IR Proximity Sensor
- Working of Ultrasonic Sensors
- Distance measurement
- Interfacing Ultrasonic Sensor

Unit-2

- DHT11 Interfacing, working principle
- Measuring temperature & Humidity using DHT11
- Analyzing sensor data on Serial Monitor & Serial Plotter
- Sensor Data Logging
- Interfacing Sound Sensor
- Selecting a sensor for your use case
- Commercial/Industrial/Military/Medical/Food grade sensors
- Pulse Width Modulation
- Using Timers in Node MCU
- LED Intensity controlling using PWM
- Working with Relay
- Relay Interfacing with Node MCU
- Controlling AC Appliances with from PC

Unit-3

- Getting started with HC05 – Bluetooth Module
- Connecting HC05 with Node MCU
- Sensor Data Analytics using readily available Bluetooth Terminal Android Apps
- Android Controlled Device Automation with Node MCU
- Getting Started with Bluetooth UI Development with MIT App Inventor 2

Summer Training and Internship on Internet of Things (IoT)

About Training:

Industrial Internship Program (IIP) is a unique initiative launched by TechTrunk Ventures to make the students of multiple disciplines under Technical fields work on real-time projects as per Industry standards in the supervision of Industry Experts

Tools:

Programming Language:
Arduino & Python

Computational Devices:
Node MCU, Raspberry PI

Sensors:
DHT11, IR Sensor and Ultrasonic Sensor

Communication Protocols & Clouds:
MQTT, HTTP, Thingspeak, Node RED, IBM Bluemix & AWS

- Introduction to MIT App Inventor 2
- Designing UI for your Android App
- Bluetooth Client
- Backend Development, Deployment & App Testing
- Using Voice Recognition Technique
- Sending voice to text from android app via Bluetooth to Node MCU
- Analyzing string data format
- Voice controlled Device Automation
- Voice Controlled Home Automation System

Unit-4

- WIFI
- Getting Started with ESP8266-01
- Configuration, Pin Layout and Applications
- Testing AT Commands with ESP8266
- Connecting to a network• Making a Local Webserver using Node MCU
- Using Node MCU as a data server
- Designing UI for IoT Dashboard
- HTTP Request Format
- Making Local Webserver using ESP8266
- 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
- Connecting twitter with trigger switch
- Twitting Sensor data on Twitter
- Uploading Sensor data on Thingspeak using node-red
- Uploading data to IBM Watson demo Platform using node-red

Unit-5

- Getting Started with Python
- Variables, Functions and control Structure
- Calling Libraries and functions in python
- Inheritance & Object Oriented Programming
- Importing or Exporting Data
- Using matplotlib library
- Getting Started with PyQt framework
- Creating basic GUI with PyQt
- Using OOPs & designing simple Calculator using Python
- Serial Communication in Python
- Designing UI for PC Controlled Home Automation System
- Testing UI with Node MCU

Unit-6

- Getting Started with Raspberry Pi
- Installing OS in Rpi
- Command line and GUI Interface
- Raspbian OS Introduction & Tools

- Interfacing GPIOs with LEDs
- Interfacing motors
- Interfacing sensors
- Serial Communication
- Interfacing with node-red
- Sensor data to Twitter & Thingspeak from RPi
- Controlling devices from cloud platform
- Analyzing sensor data in smartphone over internet
- Creating app on IBM Bluemix
- Connecting Rpi to IBM Bluemix
- Working with Cayenne IoT Cloud Service
- Authenticating RPi with cayenne
- Controlling devices from remote location using cayenne
- Analyzing system properties and sensor data on cayenne cloud

Unit-7

- Introduction to MQTT & Communication protocol for IoT
- Understanding MQTT
- Difference between HTTP & MQTT
- Understanding MQTT Broker
- Understanding Publish & Subscribe Methods
- Testing MQTT broker with Raspberry pi
- Installing MQTT client on Raspberry Pi
- Controlling Raspberry pi via Adafruit MQTT Broker
- Controlling RPi GPIO via MQTT node in nodered
- Publishing sensor data to MQTT Broker
- Subscribing to multiple brokers