

Internet of Things (IOT)

Mode of Training: Online, Classroom, Corporate

Faculty: Mr. KUMAR

Course Duration: 45 Days



**Course
Curriculum**

INTERNET OF THINGS (IOT)

IOT – OVERVIEW

- IoT Key Features
- IoT – Advantages
- IoT – Disadvantages & How to overcome them during the design
- IoT Implementations
- Real time Scenarios
- Demo of real time project with Heart Sensor.

IOT – HARDWARE

- Sensors
 - Types of Sensors
 - Analog Sensors with examples
 - Digital Sensors with examples
 - Actuators with examples
- Microprocessors(μ P) & Microcontrollers(μ C)
 - Key Features & Differences.
 - How to choose between processor & a controller's
 - Arduino Uno & Pinout
 - Arduino Nano & Pinout
 - Arduino Mega & Pinout
 - ESP8266 & Pinout



- Node MCU & Pinout
 - AT Tiny & Pinout
 - Raspberry pi & Pinout
 - Orange Pi & Pinout
- Connectors
 - Wires / Bus wires.
 - PCBs general purpose pcbs
 - Custom PCBs using ECAD tools.

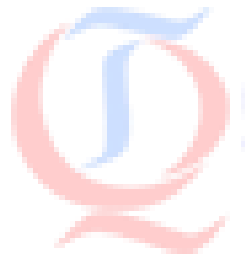
IOT – SOFTWARE

- IDE (Integrated Development Environment)
 - Introduction to IDEs
 - Arduino.cc and download software
 - Features.
 - Baud rate
 - Serial Monitor
 - Serial Plotter
 - Update Boards
 - Update Libraries
 - Debug
 - Introduction with Arduino Boards.
 - Working with Board Managers
 - GPIO.
 - Interfacing sensors with Arduino boards.



IOT PROGRAMMING

- Programming IOT devices using Arduino C++ , Python , Lua Scripting
- Basics of Arduino C++ , Python, Lua Scripting
- Input-Output
- Reading from the Serial
- Writing to Serial
- OOPS Concepts
- If loops
- If else loop
- While loop
- for loop
- Introduction to Functions
- Using OEM libraries.



IOT GATEWAYS

- Introduction to IOT Gateways
- Different types of gateways
- Advantages and Disadvantages of each of the gateways
- Choose the right Gateway according to your Requirement

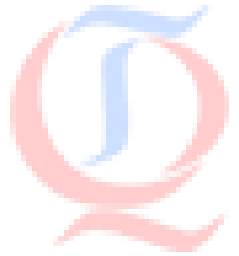
IOT COMMUNICATION

- Machine to Machine Communication (m2m)
- Advantages & Disadvantages
 - Types

- Bluetooth
- Wi-Fi
- Radio Frequency (RF Channel)
- ZigBee
- Lora WAN
- NFRC (Near Field Radio Frequency)

➤ Machine to Cloud Transportation

- Purpose of Cloud
- Advantages & Disadvantages
- Cloud Examples
- AWS - S3 / Lambda
- Think Speak
- Spark fun
- Blynk Mobile App



- Build your own Cloud and connect Blynk App

Advantages

- Privacy
- Better Security
- More Options

IOT PROTOCOLS

- HTTPs/REST - IPV4 IPV6
 - Advanced Networking
 - Webserver

- Rest Client
- AMQP - Azure IoT SDK
 - Usage of AMQP for Microsoft Azure cloud
 - Advantages and Disadvantages
 - Best Practices and Usages of AMQP
- MQTT - Mosquito MQTT
 - Usage of MQTT for transporting Data to Cloud
 - Advantages and Disadvantages
 - Best Practices and Usages of MQTT
- CoAP
 - Usage of CoAP protocol
 - Advantages & Disadvantages
 - Best Practices and usage



IOT – SECURITY

- Authentication
 - Overview of Authentication
 - Why it is needed
 - Different ways of authentication
 - Testing them with Bruteforce tools
 - Examples
 - Implementation on IOT devices
- Remote Debug
 - Remote Connectivity of IOT Device
 - Direct Connection

- Remote Connection
- Retrieving debug logs for error codes
- Include in Remote Code in IOT Devices
- Encryption
 - Types of Encryption
 - Simple and Best Usage
 - Examples
- Privacy
 - overview of privacy
 - how it is being implemented
 - Publishing Data over Cloud
 - Examples
- Authorization
 - Overview
 - How is it is implemented in IOT and Cloud
 - Implementations examples
- Remote Firmware Upgrade
 - Why is Firmware Upgrade is needed
 - Over The Air Upgrade
 - Manual and Automatic Upgrade
 - Examples.



REAL TIME PROJECT:

- Requirement Documents
- Design

- Detailed Design
- Development
- Testing of IOT Devices.
- Test Cases
- Build & Deployment
- Monitoring
- Trouble Shooting

IOT – USE CASES Week 10

- Engineering,
- Industry, and
- Infrastructure
- Government and Safety
- Home and Office
- Health and Medicine



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