IOT COURSE CONTENT

Session-1 Theory [Getting started with basics]

❖ 1.1 Introduction to IoT

➢ 1.1.1 What is IoT?

➢ 1.1.2 Why do we need IoT?

➢ 1.1.3 Definition of IoT

➢ 1.1.4 History of IoT

➢ 1.1.5 Applications

➢ 1.1.6 Market Study

Basic IOT Architecture

❖ 1.2 Three Stages of IoT

➢ 1.2.1 How to fetch The real world Data Or Unique Identity Data

➢ 1.2.2 How to store these In a Gateway Buffer or How to hold Data

➢ 1.2.3 How to Pass the Data on to the network for controlling via App or any remote Device

❖ How to Decide IoT gateway? (Raspberry-Pi/Arduino)

➢ 1.3.1 What is Gateway ? why its needed ? Difference between IoT gateway and WSN Device?

➢ 1.3.2 Difference between IoT gateway protocols and WSN protocols.

➢ 1.3.3 Design consideration of IoT Hardware/SoC in terms of Power consumption,Data memory, Range/connectivity, Protocols constraints on Soc, Run-time etc.

Session -2 Practical (Let's start with fetching the data and store it On to the gateway)

❖ **2.1 The Arduino Platform**

➢ 2.1.1 The Arduino Open-Microcontroller Platform

➢ 2.1.2 Arduino Basics

➢ 2.1.3 Arduino Board Layout & Architecture

❖ **2.2 Programming fundamentals (C language)**

❖ **2.3 Arduino Programming & Interface of Sensors**

➢ 2.3.1 Interfacing sensors with Arduino

➢ 2.3.2 Programming Arduino

➢ 2.3.3 Reading from Sensors (real world data)

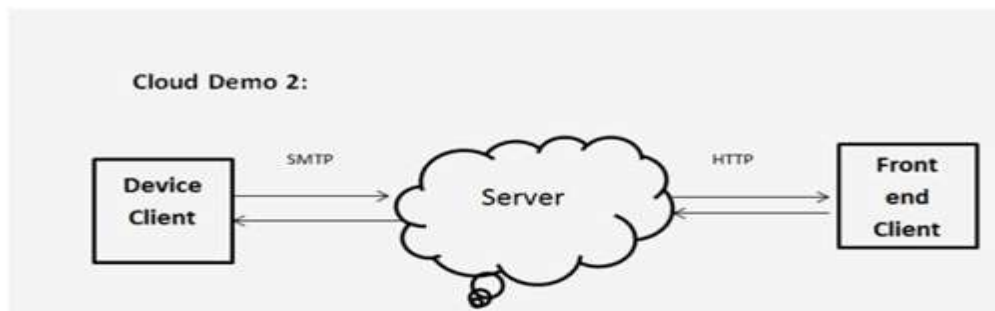**Session-3Theory&CloudPracticalDemo1**

[Why MQTT or COAP not HTTP]

❖ **Upload Data on IoT Cloud Running on HTTP & SMTP Protocol and Monitor Graphically**

➢ 3.1 Network & connectivity

➢ 3.2 Broker Theory and comparison

➢ 3.3 Run-times

➢ 3.4 Power & complexity

➢ 3.5 Security

➢ 3.6 Upgrades & maintenance

❖ **Theory & Cloud Practical Demo 2**

Cloud Demo 2:

Device Client — SMTP → Server — HTTP → Front end Client

Session-4

❖ **Access Devices Through IoT Cloud Platform**

➢ 4.1 Data Latency

➢ 4.2 Scalability

➢ 4.3 Security

➢ 4.4 Bandwidth efficiency

➢ 4.5 Power efficiency

➢ 4.6QualityOfService

Session-5

❖ **IoT NETWORK PROTOCOL STACK MODEL**

➢ 5.1 Send data on to server through ehternet (W5100) and IoT protocols:

   MQTT/MQTTS , CoAP , LoWPAN like TCP, UDP, HTTP/S.

➢ 5.2 Why MQTT protocol for IOT (why companies like amazon, Tata Motors, 2elemetry etc have selected

➢ 5.3 MQTT protocol for their web service for IOT.

➢ 5.4 IPV4 addressing problem for IOT and introduction to IPv6 is required to address more devices.

Session-6 Practical [Two way communication code]

❖ **MQTT Functions and working**

➢ 6.1.1 Learn How to publish or subscribe Topics through Mosquito Broker

➢ 6.1.2 Why broker needed and Comparison between different Brokers for MQTT

❖ **MQTT complete Two Way Communication code build & explanation**

❖ **End to end IoT device two way communication@ Hi-Tron platform**

❖ **Create Local IoT server platform using MQTT broker**

➢ 7.1 Comparison Between Different IoT Message Brokers.

➢ 7.2 Complete Broker Setup on Amazon Web services cloud.

➢ 7.3 Running an IoT Broker on AWS Demo using MQTTfx and MQTT lens Clients.

➢ 7.4 Create Alarm,Alert or Notification based on specific threshold values

Session-8

❖ **In the Project session, which can be controlled via Android App From any remote location will be taught. These are the list of the Ideas in which this key concept can be implemented.**

➤ Smart Home

➤ Smart Grid

➤ Smart Watches

➤ Smart Lightening

➤ Tank Level

➤ Water Flow

➤ Gas Flow Energy and Water

➤ Indoor Air Quality

➤ Temperature Monitoring

➤ Ozone Presence

➤ Forest Fire Detection

➤ Air Pollution

➤ Snow Level Monitoring Landslide and Avalanche Prevention

➤ Smart Water level Indicator

➤ Smart A.C.

➤ Smart Gas Flow Indicator

➤ Earth Quake early Detection