# INTERNET OF THINGS
## Course Content

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# COURSE CONTENT

## ABOUT US

Entrench Electronics Pvt. Ltd. is an emerging venture working towards the goal of changing conventional ways and imparting education to the College/School students.

## INTERNET OF THINGS

This is a two-day hands on workshop which covers the essentials of Internet of things. It will cover the comprehensive overview, architecture, protocols and innovative tools and technologies serving the IoT such as Node-red, Arduino IDE and Mosquitto. This workshop also includes tutorials aimed at providing hands-on experience in application development using IoT tools.
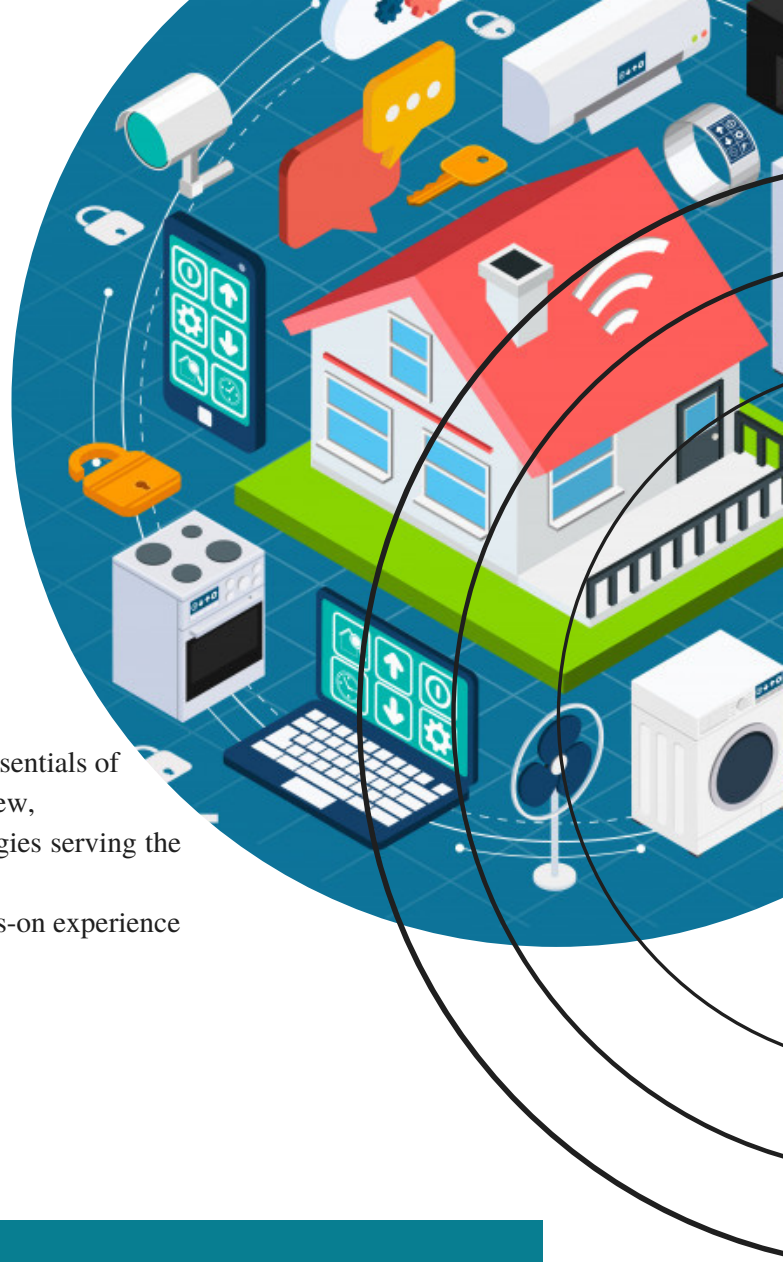
## CONTENT

**Introduction to IoT**
- History of Internet of Things
- Introduction to IoT concepts and terminology
- Applications & Requirements
- IoT Architecture and Technologies
- Introduction to IoT Reference architectures
- IoT Building blocks- Sensing, Connectivity, Gateways
- Role of IoT platforms- Kaa IoT Platform, Industry 4.0

**Standards and Protocols**
- Machine-to-Machine communication
- Communication Standard- RFC7452
- Data Exchange Format- XML & JSON
- Understanding Protocol (HTTP, MQTT, CoAP

MQTT Protocol
- Protocol Header, Packet Structure, Handshake
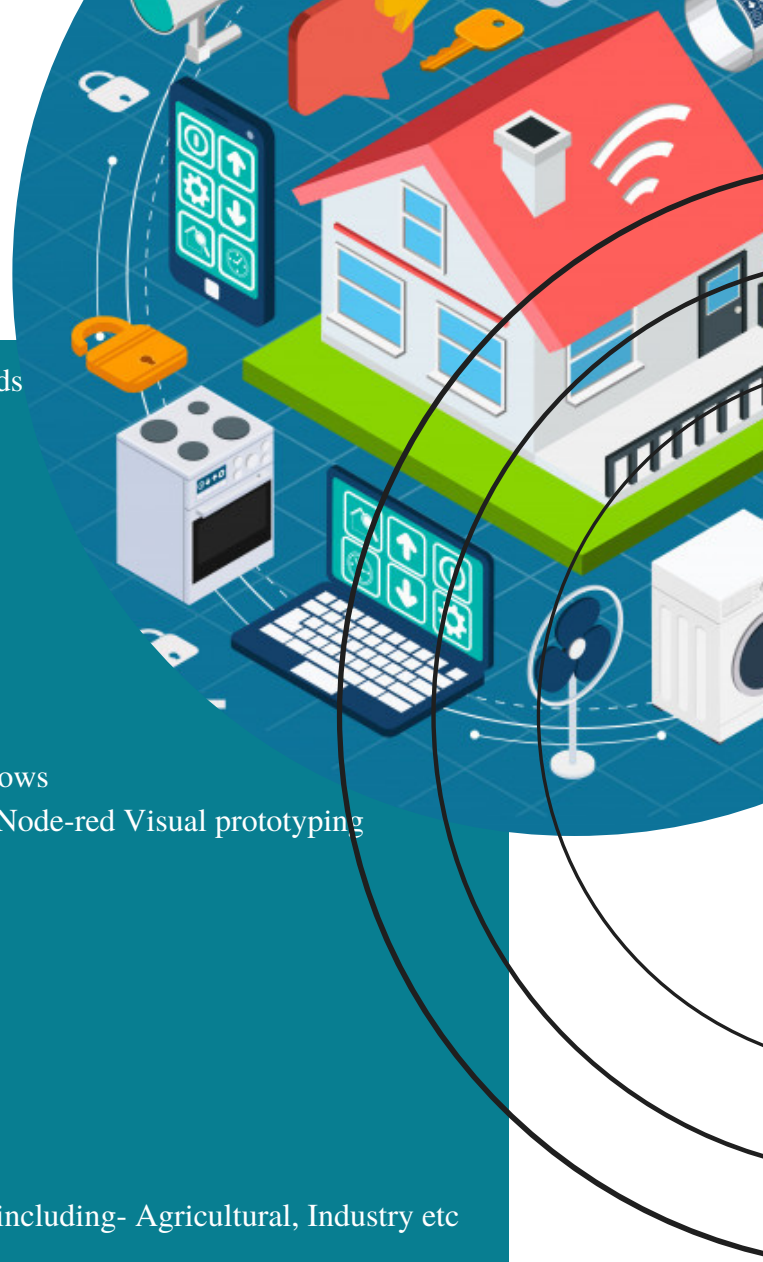- Publish-Subscribe Communication model

# COURSE CONTENT

- Understanding MQTT Broker, Topics, Wildcards
- QoS Level, Last will and Testament
- Authentication and Authorization
- Setting up the MOTT Broker and clients
- Tools and Libraries - Eclipse Paho, Mqtt.js

Introduction to Node-Red
- Understanding Node-red
- Quickly build IoT prototypes using Node-red
- Build IoT solution flows, import/export these flows
- Create dashboard for monitoring sensors using Node-red Visual prototyping
- Working with Environment Sensors
- Interfacing DHT11 to NodeMCU
- Creating Data streams
- Securing IoT Devices
- Encryption Techniques (AES 256)
- Over-The-Air (OTA) updates

IoT Use Cases
- Understanding IoT Use cases for various types including- Agricultural, Industry etc
- IoT based Data Acquisition
- Understanding Data Acquisition techniques
- Applying Rules on data streams
- Creating flat files using sensor data streams

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## Kit Content

# KIT CONTENT

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# KIT CONTENT

- NodeMCU Board
- IR Sensor
- Single Channel Relay Module
- Buzzer Module
- POT 10K
- LED 3mm & 5mm
- Resistor 1K
- Resistor 10K
- Switch
- Breadboard
- Micro USB Cable
- Connecting Wires (M-F)
- Connecting Wires (M-M)