

# INTRODUCTION TO IOT

## COURSE HANDOUT



# ROLLY FALCO

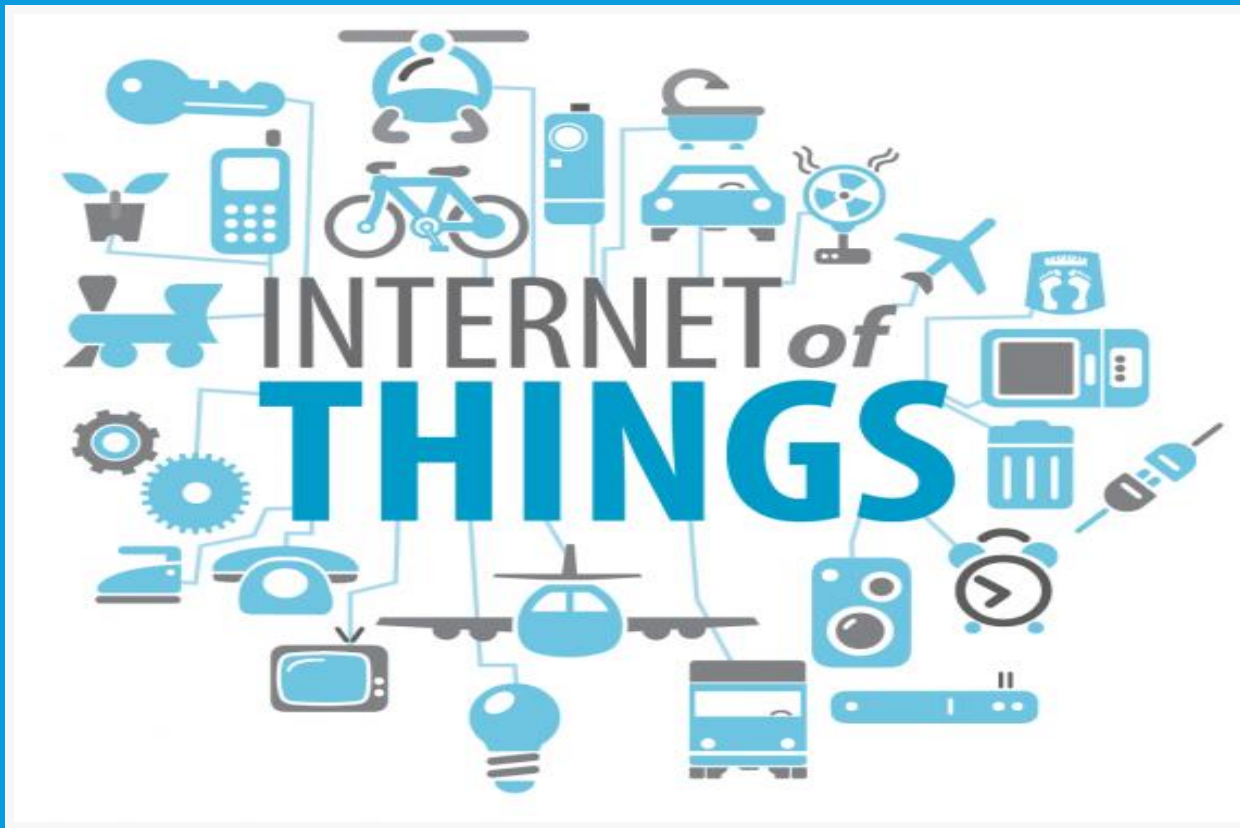
## INSTRUCTOR

- Senior System Administrator of National Water Company
- System Analyst and a Full Stack Developer
- Electronic Enthusiast
- DIY Hobbyist

# TOPICS SUMMARY

- Internet of Things (IoT) Introduction
- Real World IoT Applications
- Cloud Computing in IoT
- Back-End Demystified
- IoT Pre-Requisites
- IoT Course Projects

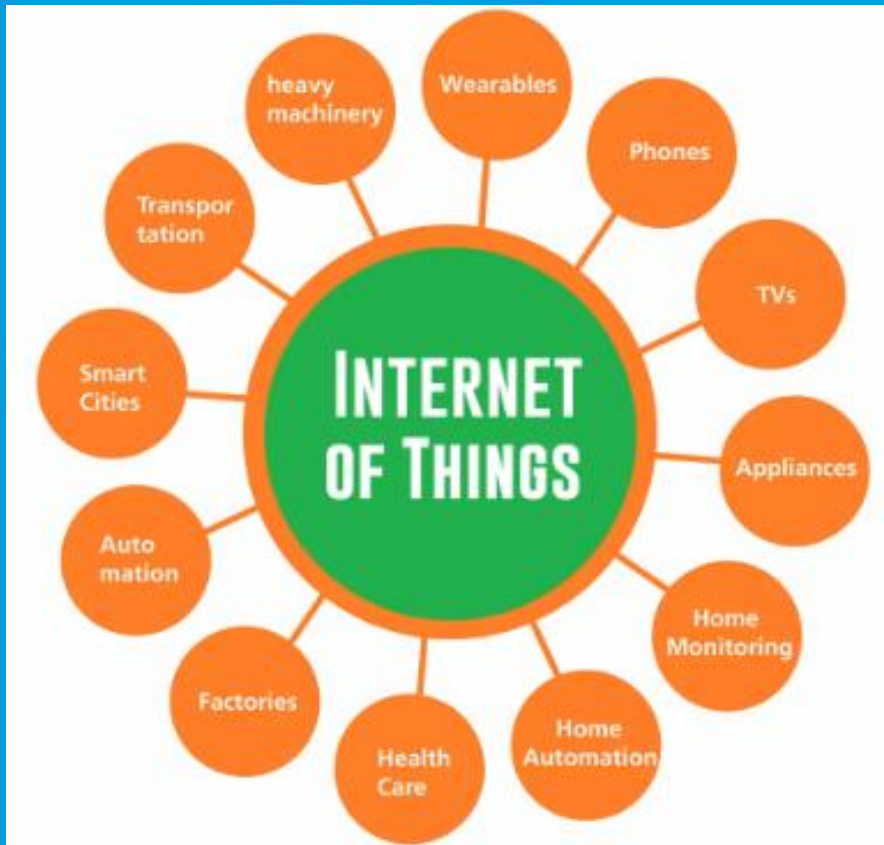
# INTERNET OF THINGS (IOT) INTRODUCTION



# Internet of Things (IoT)

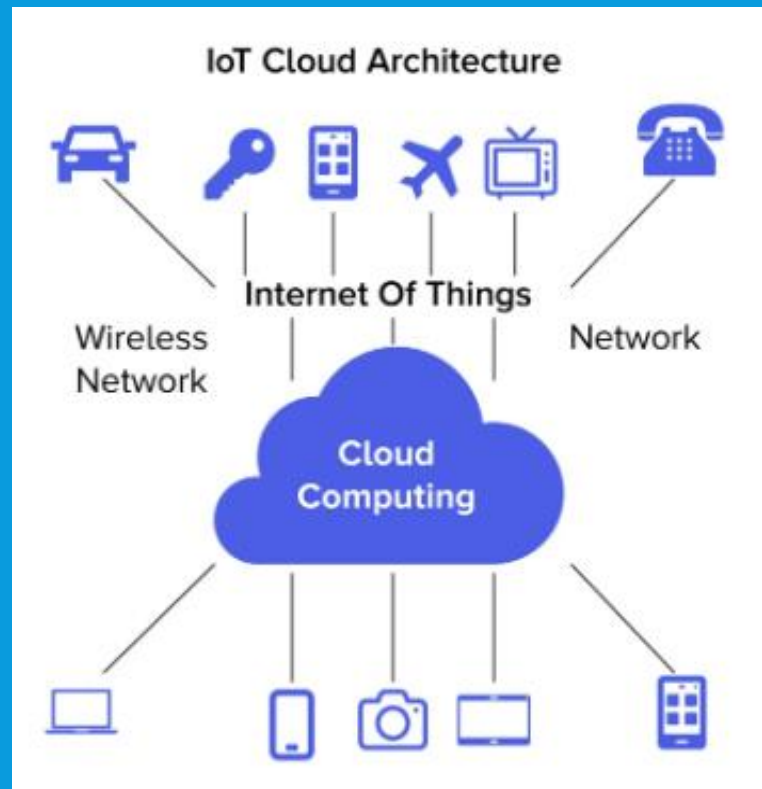
Introduction: IoT refers to the interconnected network of physical devices, vehicles, home appliances, and other items embedded with electronics, software, sensors, and connectivity which enables these objects to connect and exchange data.

# REAL WORLD IOT APPLICATIONS



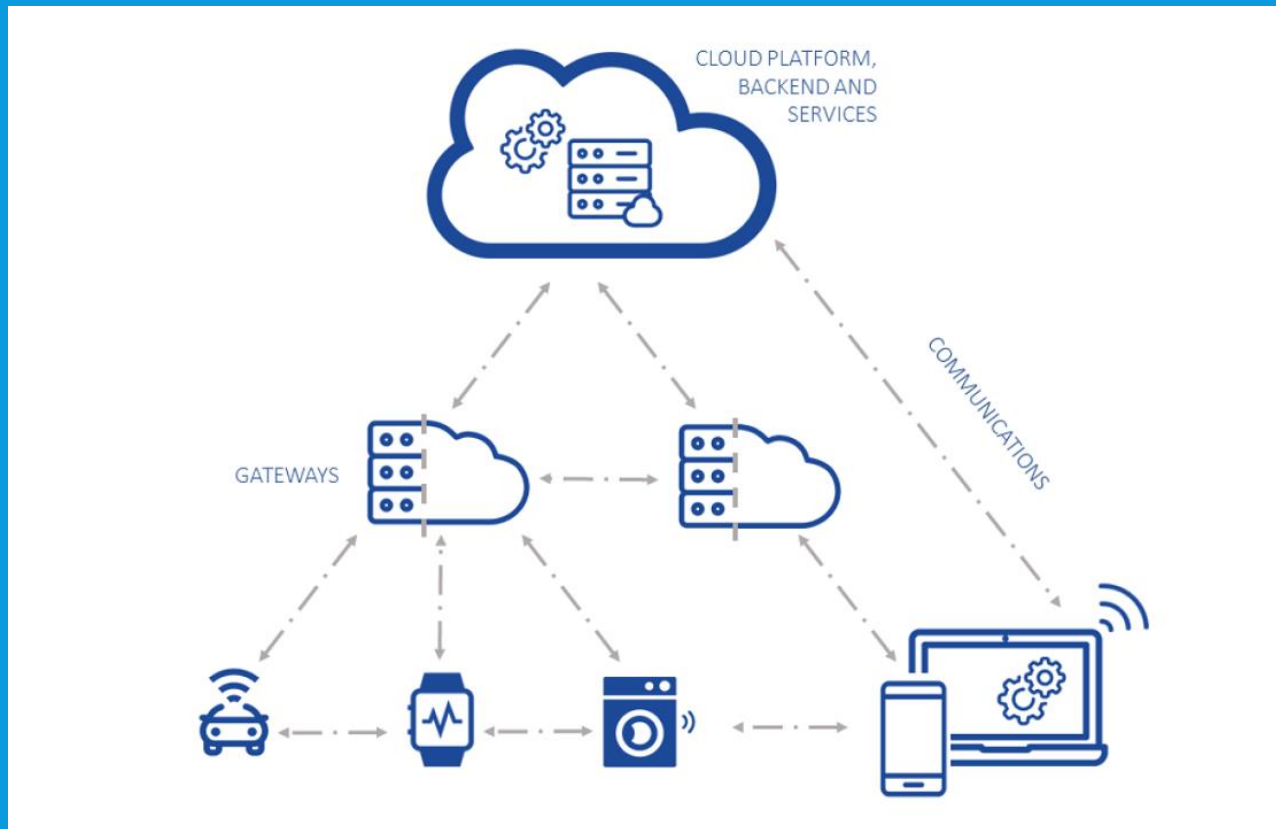
Real World IoT Applications: IoT has numerous applications in various domains including healthcare, transportation, smart homes, industrial internet, and more. Examples include wearable devices for health monitoring, connected cars for improved safety and efficiency, and smart home systems for energy management.

# CLOUD COMPUTING IN IOT



Cloud Computing in IoT: Cloud computing plays a crucial role in IoT by providing scalable and flexible computing resources and storage for the vast amounts of data generated by IoT devices. It enables IoT data to be analyzed and processed in real-time, leading to improved decision-making and increased efficiency.

# BACK-END DEMYSTIFIED



Back-End Demystified: The back-end of an IoT system refers to the server-side infrastructure and software that stores, processes, and retrieves data from IoT devices. This is a critical component of IoT systems as it enables secure communication, data storage, and processing of the vast amounts of data generated by IoT devices.

# IOT TECHNICIAN PRE-REQUISITES

As an IoT Engineer/Technician , you should have the following skills and knowledge:

Strong knowledge of electronics, sensors, and microcontrollers

Familiarity with networking protocols and communication technologies (e.g. Wi-Fi, Bluetooth, Zigbee, etc.)

Knowledge of operating systems and programming languages used in IoT development (e.g. Linux, Python, C/C++)

Ability to troubleshoot and debug hardware and software issues

Understanding of security principles for IoT devices

Experience with cloud computing platforms for data storage and analysis (e.g. AWS, Microsoft Azure, Google Cloud)

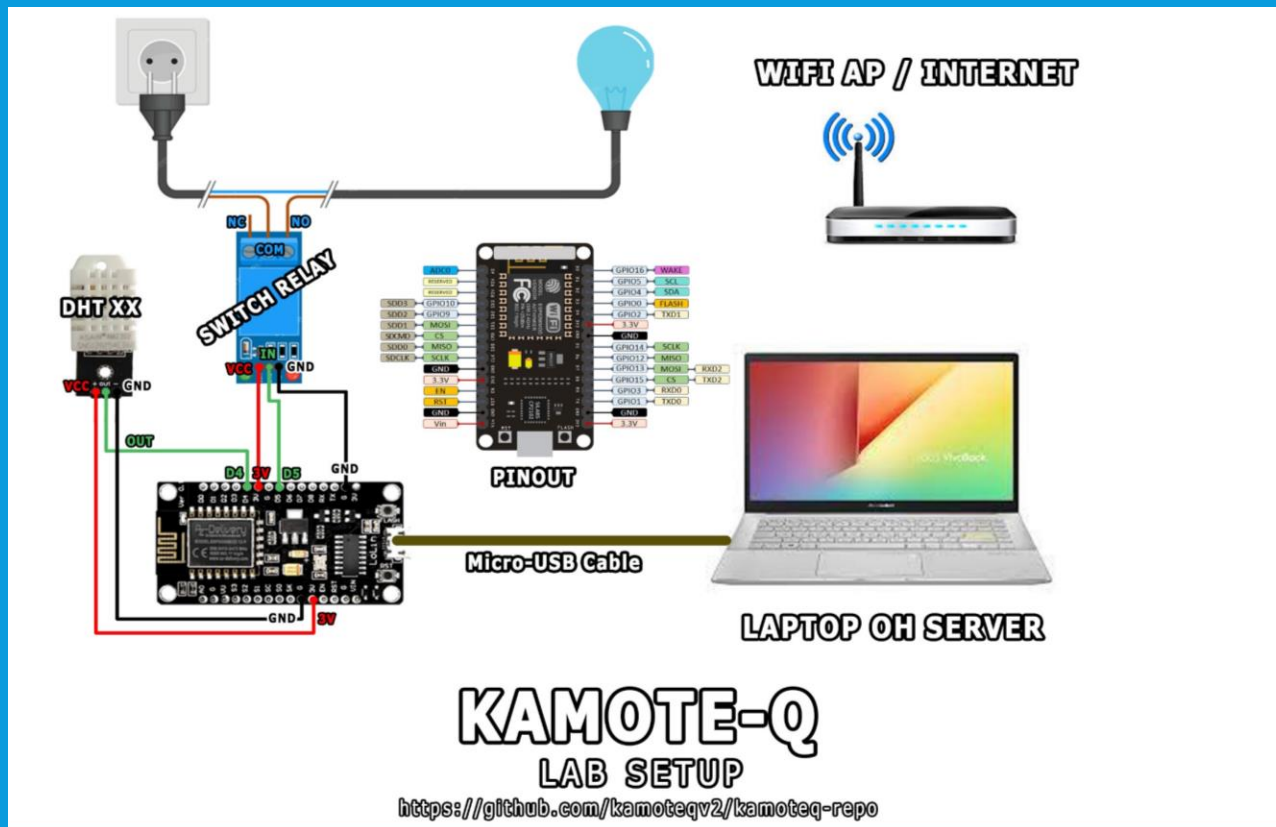
Familiarity with IoT development tools and platforms (e.g. Raspberry Pi, Arduino, etc.)

Good problem-solving and critical thinking skills



# LAB SETUP

## FOR THIS COURSE



### CONNECTIONS

DHT (+) Connected to ESP 3v

DHT (-) Connected to ESP GND

DHT (OUT) Connected to ESP D<sub>4</sub>/GPIO<sub>2</sub>

SWITCH/RELAY (+) Connected to ESP 3v

SWITCH/RELAY (IN) Connected to ESP GPIO<sub>14</sub>/D<sub>5</sub>

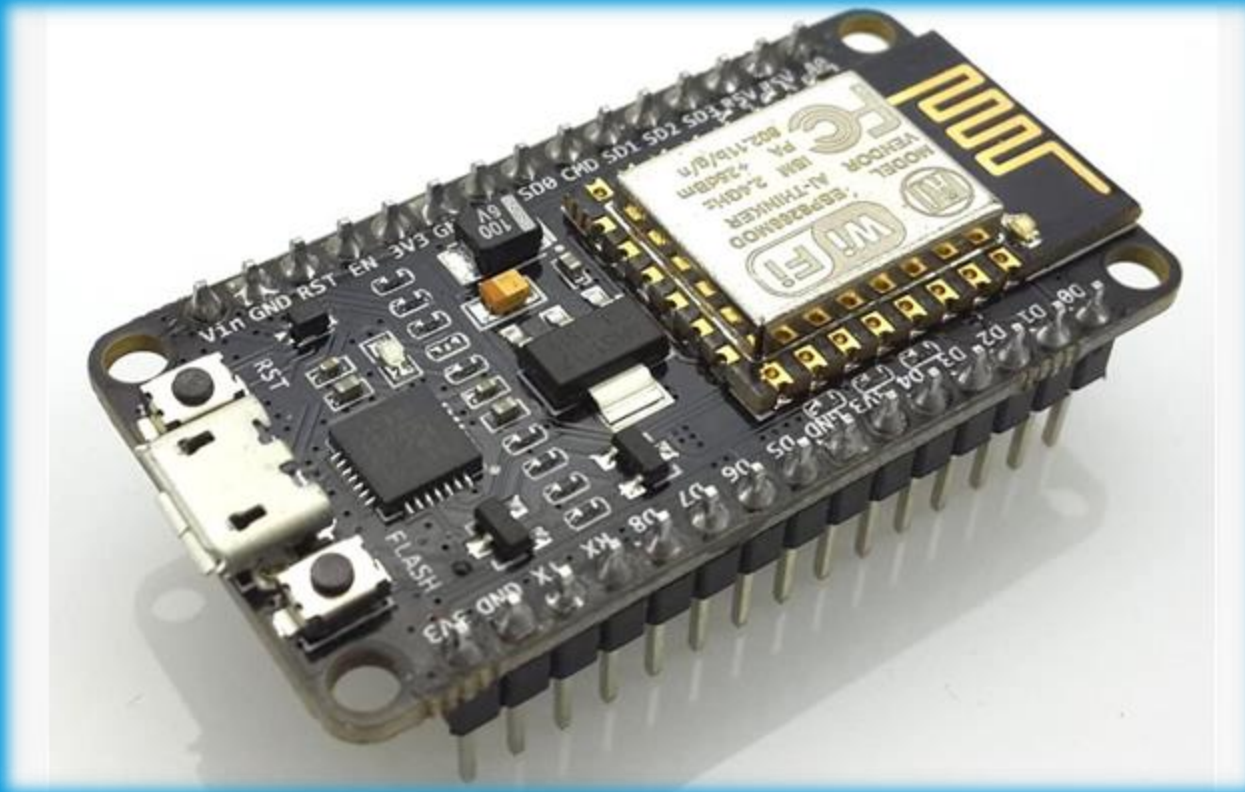
SWITCH/RELAY (-) Connected to ESP GND

# PRE-REQUISITES

In this course the student must have the following requirements to effectively learn and understand the courseware on this handout

# MATERIALS AND TOOLS

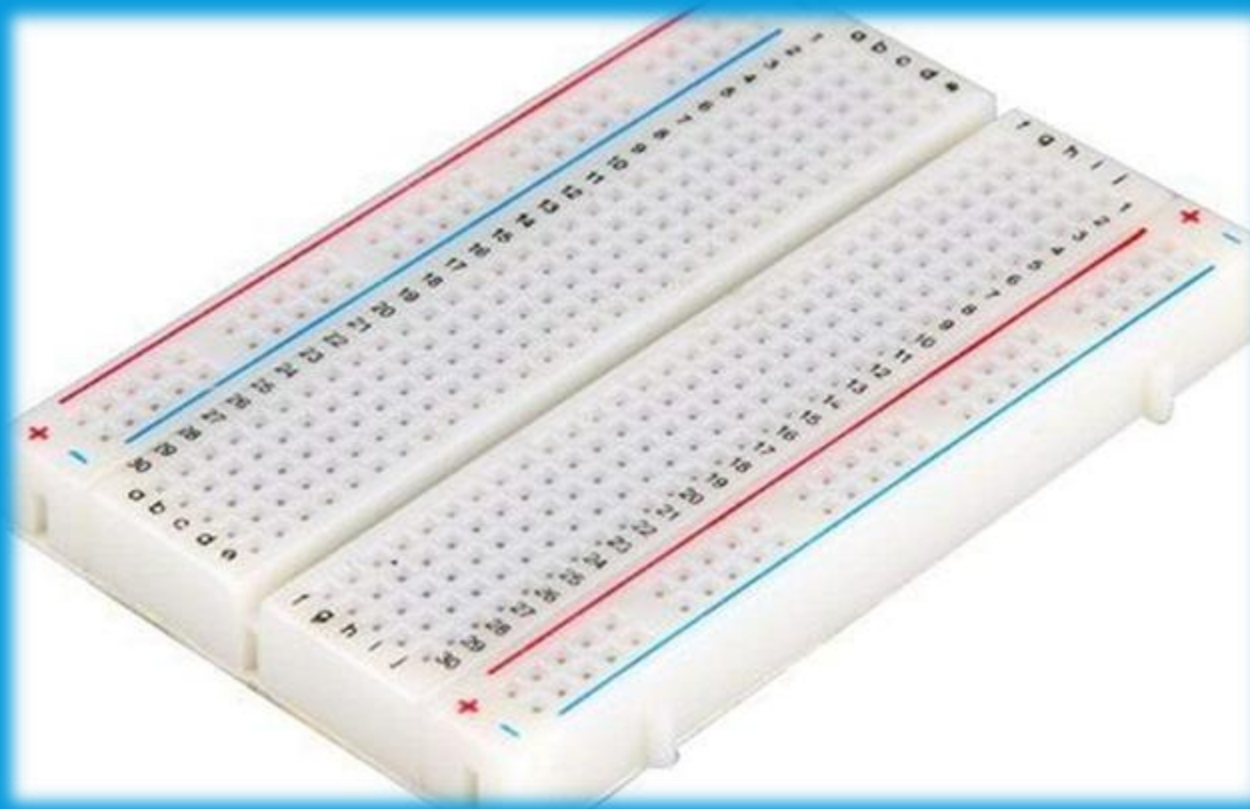
# ESP8266 NODEMCU



NodeMCU is a microcontroller development board with WIFI capability.

It uses an ESP8266 microcontroller chip

# BREAD BOARD



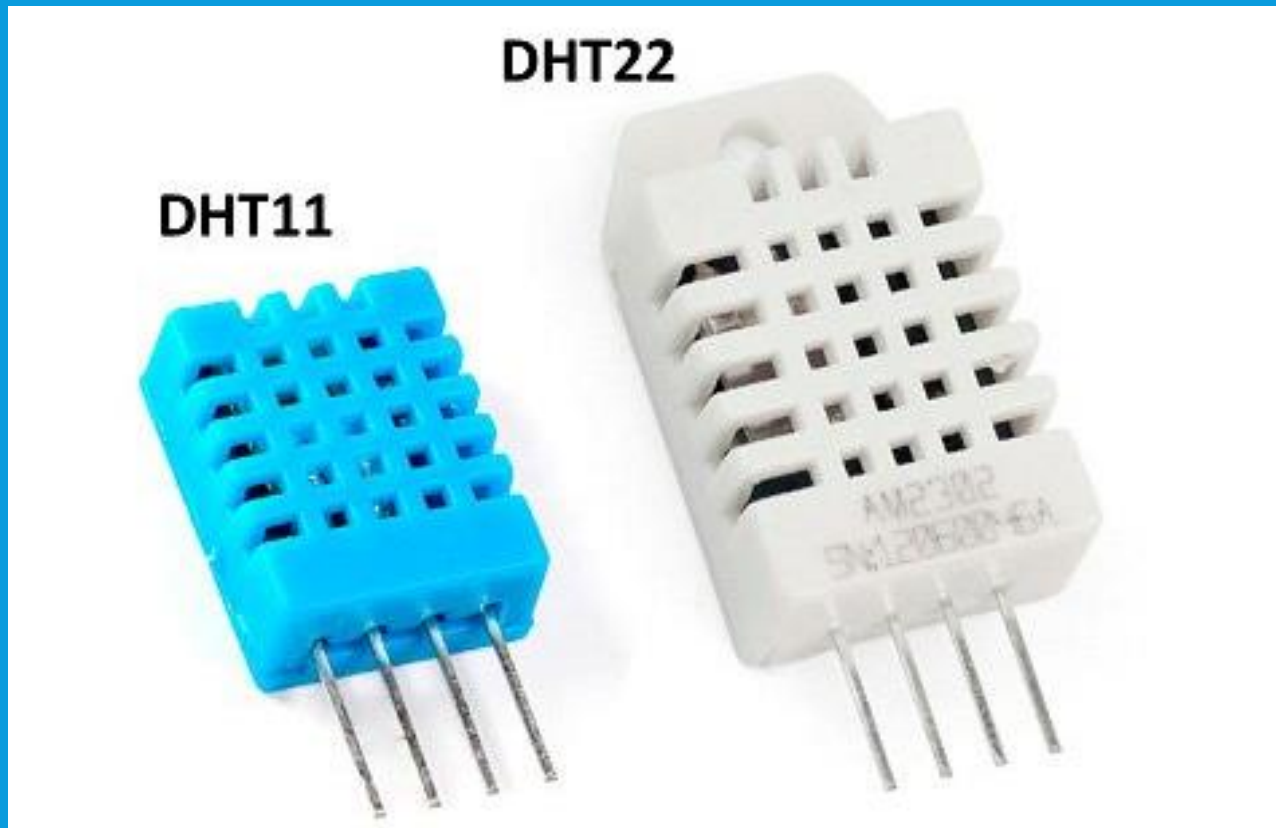
A breadboard is used to build and test circuits quickly before finalizing any circuit design

# JUMPER WIRES



Jumper wires are used for making connections between items on your breadboard and your Arduino's header pins

# DHT SENSORS



DHT11 is a low-cost digital sensor for sensing temperature and humidity. This sensor can be easily interfaced with any micro-controller such as Arduino, Raspberry Pi etc.



# MICRO USB CABLE



**Micro USB Cable** Nylon Braided  
Fast Quick Charger Cable USB  
to Micro USB 2.0 Android  
Charging Cord Compatible  
for Android Phones



# BULB LIGHT



Bulb and Bulb holder with plug

# SMARTPHONE



We will be using the extra features such as accessing and controlling our switches from our smartphones and from the cloud

In this module we are using android phones

# LAPTOP/DESKTOP



Where OpenHAB server will be installed and ESP8266 will be flash and programmed

Required OS: Windows 8 or above

# WIFI ROUTER



Access point for wireless devices to connect to local and internet network

# ONLINE ACCOUNT AND SUBSCRIPTIONS

New Gmail Account

GitHub Account

Postman Account

# SOFTWARE

JAVA SDK

OPENHAB WINDOWS VERSION

ARDUINO IDE

NodeMCU Flasher

KMQ Firmware