

IOT AND CLOUD COMPUTING LAB

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IOT AND CLOUD COMPUTING LAB

Course	B.Tech.-VI-Sem.	L	T	P	C
Course Code	22CSPC64	-	-	2	1

Course Outcomes (COs) & CO-PO Mapping (3-Strong; 2-Medium; 1-Weak Correlation)

COs	Upon completion of course the students will be able to	PO4	PO5	PO9	PSO2
CO1	identify various IoT devices	3	3	3	3
CO2	use IoT devices in various applications	3	3	3	3
CO3	develop automation work-flow in IoT enabled cloud environment	3	3	3	3
CO4	take part in practicing and monitoring remotely	3	3	3	3
CO5	make use of various IoT protocols in cloud	3	3	3	3

List of Experiments

Week	Title/Experiment
1	Install necessary software for Arduino and Raspberry Pi.
2	Familiarization with Arduino and Raspberry Pi board.
3	Write a program to transfer sensor data to a Smartphone using Bluetooth on Arduino.
4	Write a program to implement RFID using Arduino.
5	Write a Program to monitor temperature and humidity using Arduino and Raspberry Pi.
6	Write a Program to interface IR sensors with Arduino using IoT Cloud Application.
7	Write a Program to upload temperature and humidity data to the cloud using an Arduino or Raspberry Pi.
8	Write a program to retrieve temperature and humidity data from the cloud using Arduino and Raspberry Pi.
9	Write a program to create a TCP server on cloud using Arduino and respond with humidity data to the TCP client when requested.
10	Write a program to create a UDP server on cloud using Arduino and respond with humidity data to the UDP client when requested.

References

1. IoT and Cloud Computing Lab Manual, Department of CSE, CMRIT, Hyd.

Micro-Projects: Student should submit a report on one of the following/any other micro-project(s) approved by the lab faculty before commencement of lab internal examination.

1. Air Pollution Meter.
2. Smart Garbage Collector.
3. Weather monitoring system.
4. Baggage Tracker.
5. Circuit Breakage Detection.
6. Anti-Theft Flooring System.
7. IoT Based Smart Street Light.
8. IoT based Gas Leakage Monitoring system.
9. IoT Based Smart Irrigation System.
10. IoT Based Water Level Monitoring System.

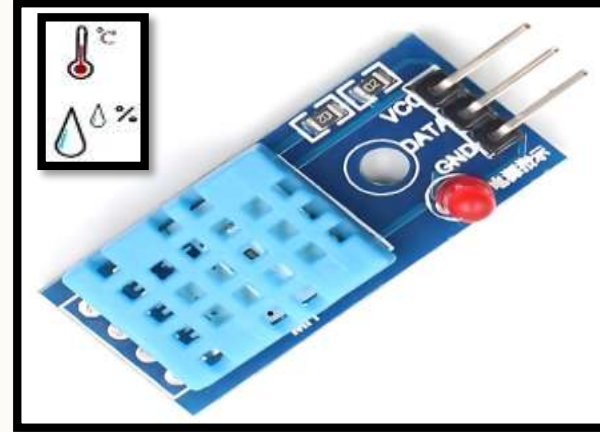
Aim: Write a program on Arduino/Raspberry Pi to upload temperature and humidity data to cloud.

Hardware Requirements:

1. Arduino UNO board
2. NodeMCU ESP8266 Breakout Board
3. DHT-11 temperature and humidity sensor
4. Jumper wires
5. Bread board
6. WIFI Network

Procedure:

1. Download esp8266 Zip file->go to libraries->add Zip file
2. Connect Node MCU, Go to tools->change board to Node MCU esp8266 and port number
3. Connect DHT-11 temperature and Humidity sensor to Node MCU
4. Sign up to cloud->create channels->copy API key to the source code
5. SSID and password of your WIFI connection should be given in source code
6. Compile and upload the program and verify the temperature and humidity readings in serial monitor
7. Go to cloud and verify the temperature and humidity values in graph.





The **DHT11** is a **digital temperature and humidity sensor** that provides calibrated **output via a single-wire communication protocol**.

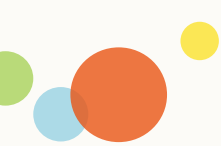
- ❖ It is commonly used in
- ✓ weather monitoring systems,
- ✓ home automation, and
- ✓ IoT applications.

1. Weather Monitoring Systems

📏 Used in DIY and professional **weather stations** to measure temperature and humidity levels.

2. Home Automation & Smart Homes

🏠 Integrated into IoT-based smart home systems for automatic **climate control, triggering fans, air purifiers, or dehumidifiers**.



3. Greenhouse Monitoring

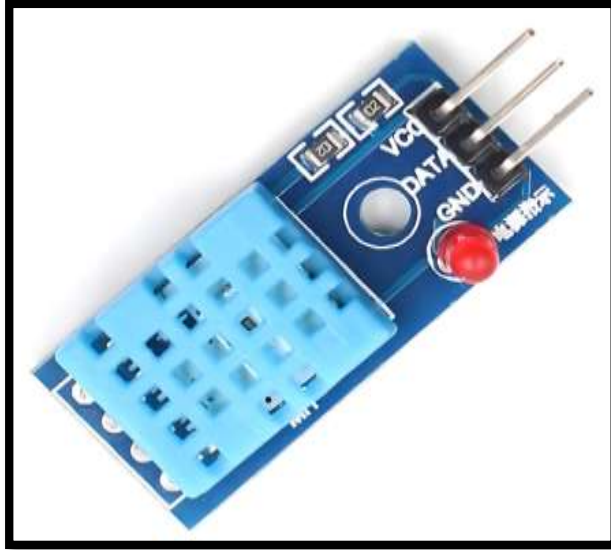
🌱 Helps maintain **optimal temperature and humidity** levels for **plant growth** in agricultural environments.

4. Industrial Environmental Monitoring

🏭 Used in **factories and warehouses** to monitor environmental conditions that affect machinery and stored goods.

5. HVAC (Heating, Ventilation, and Air Conditioning) Systems

❄️ □ Helps in **climate control systems** by providing **real-time temperature and humidity** data for automated adjustments.



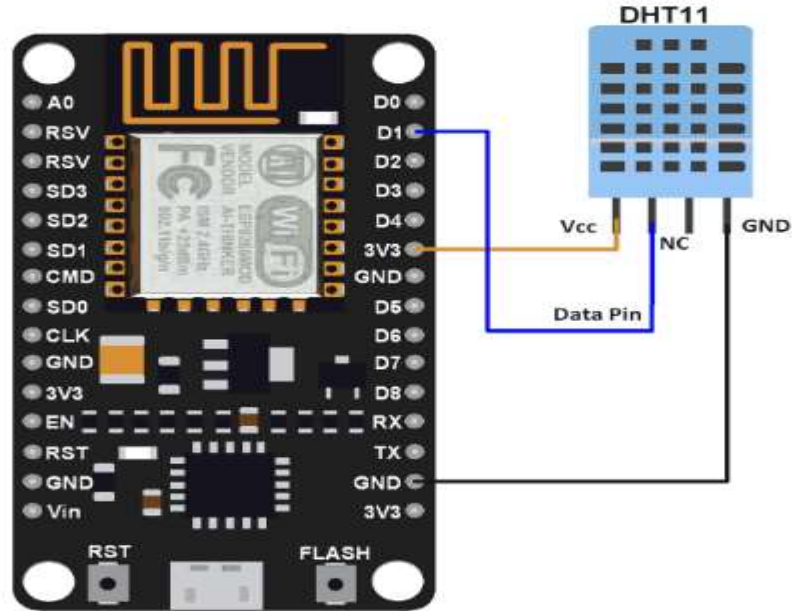
Specifications:

- **Temperature Range:** 0°C to 50°C ($\pm 2^\circ\text{C}$ accuracy)
- **Humidity Range:** 20% to 90% RH ($\pm 5\%$ accuracy)
- **Operating Voltage:** 3.3V - 5V
- **Output Signal:** Digital (single-wire)
- **Sampling Rate:** 1 Hz (one reading per second)
- **Response Time:** ~ 2 seconds
- **Dimensions:** 15mm x 12mm x 5mm

Pinout:

1. **VCC** - Power supply (3.3V or 5V)
2. **Data** - Digital output (connect to a pull-up resistor, typically 4.7k Ω)
3. **GND** - Ground

Connection Diagram DHT11 with NodeMCU



NodeMCU interfaced with DHT11

OUTPUT:1

```
50 | float n = unc.redundancy(),
```

Output Serial Monitor

```
Writing at 0x00004000... (15 %)
Writing at 0x00008000... (23 %)
Writing at 0x0000c000... (30 %)
Writing at 0x00010000... (38 %)
Writing at 0x00014000... (46 %)
Writing at 0x00018000... (53 %)
Writing at 0x0001c000... (61 %)
Writing at 0x00020000... (69 %)
Writing at 0x00024000... (76 %)
Writing at 0x00028000... (84 %)
Writing at 0x0002c000... (92 %)
Writing at 0x00030000... (100 %)
Wrote 283200 bytes (207806 compressed) at 0x00000000 in 18.5 seconds (effective 122.5 kbit/s)...
Hash of data verified.

Leaving...
Hard resetting via RTS pin...
```

OUTPUT:2

Output Serial Monitor ×

Message (Enter to send message to 'NodeMCU 1.0 (ESP-12E Module)' on 'COM11')

```
Temperature: 33.40 degrees Celcius, Humidity: 95.00%. Send to Thingspeak.  
Waiting...  
Temperature: 33.30 degrees Celcius, Humidity: 95.00%. Send to Thingspeak.  
Waiting...  
Temperature: 33.50 degrees Celcius, Humidity: 95.00%. Send to Thingspeak.  
Waiting...  
Temperature: 33.50 degrees Celcius, Humidity: 95.00%. Send to Thingspeak.  
Waiting...  
Temperature: 33.50 degrees Celcius, Humidity: 95.00%. Send to Thingspeak.  
Waiting...  
Temperature: 33.60 degrees Celcius, Humidity: 95.00%. Send to Thingspeak.  
Waiting...  
Temperature: 33.50 degrees Celcius, Humidity: 95.00%. Send to Thingspeak.  
Waiting...  
Temperature: 33.50 degrees Celcius, Humidity: 95.00%. Send to Thingspeak.  
Waiting...
```

Uploading the data in CLOUD:



week7

Channel ID: 2846212

Author: mwa0000036863193

Access: Private

Private View

Public View

Channel Settings

Sharing

API Keys

Data Import / Export

+ Add Visualizations

+ Add Widgets

Export recent data

MATLAB Analysis

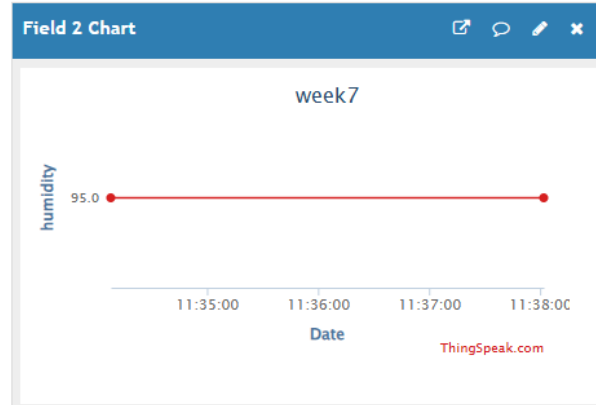
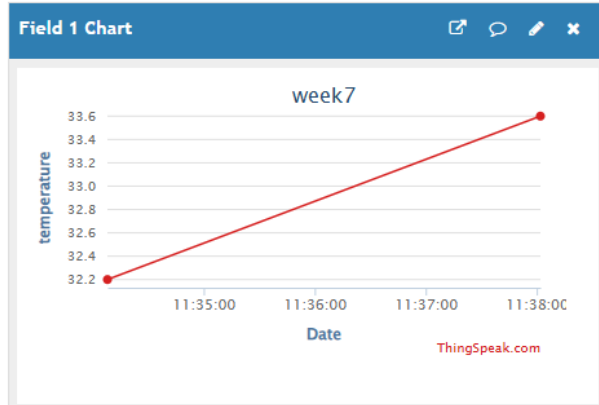
MATLAB Visualization

Channel Stats

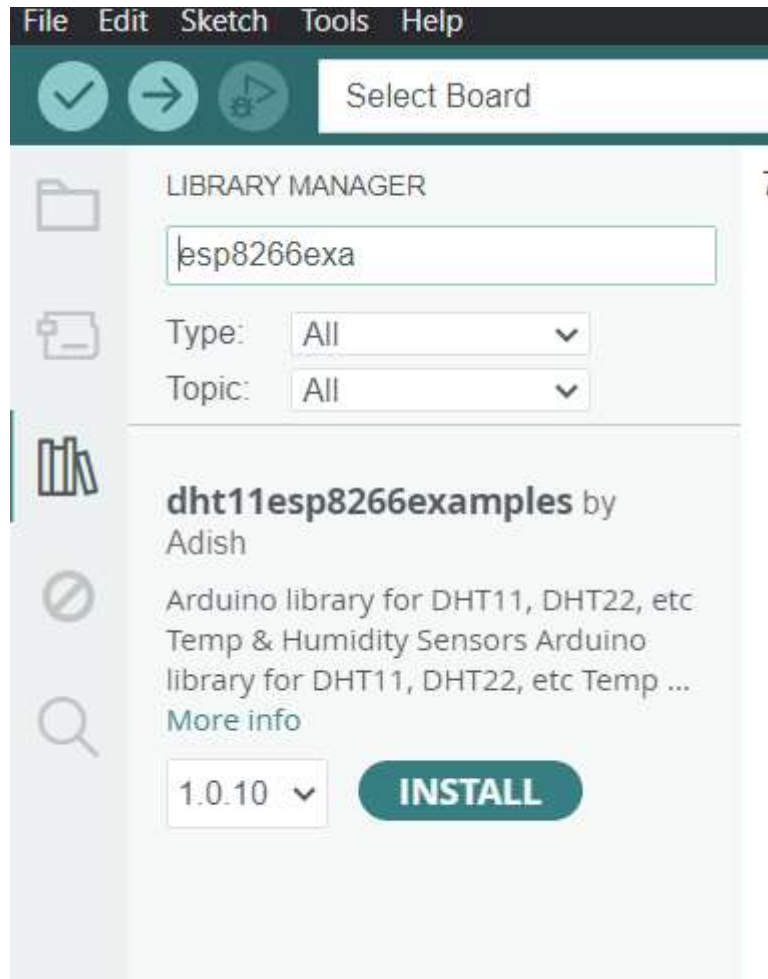
Created: 16 days ago

Last entry: 7 minutes ago

Entries: 2



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THANK YOU!

THANK YOU FOR WATCHING

