DHA SUFFA UNIVERSITY

MEASUREMENT & INSTRUMENTATION LAB
ME-3103L

Lab # 05

Temperature & Humidity Sensor

Name: _____ **Reg. #** M E - __ __ __ __ __ __

Class: _____ **Section:** _____ **Max Marks:** 20

INSTRUCTIONS

I. Submit all the lab tasks and post lab tasks printed on A4 paper with **question**, **code**, **picture** and **schematic** of circuit, stapled together with lab manual and filled rubrics.
II. Explain the code by adding **comments**. Marks will be **deducted** for programs without explanation.
III. The due date of submission is exactly **7 days after performing the lab.**
IV. Reports handed **after the deadline** will not be considered.
V. It is always good to mention your name, ID and page # on each page.

OBJECTIVE

To understand the working of DHT22 Temperature and Humidity Sensor and perform the measurement on serial monitor using Arduino.

EQUIPMENT

- 1 x Arduino Uno (w/ USB cable)
- 1 x DHT22 Sensor
- 1 x Breadboard
- Jumper Wires
- 1 x LED
- 1 x 1K Ohm Resistor

COMMANDS

- **Include Library**
  syntax: #include <LIBRARYNAME.h>

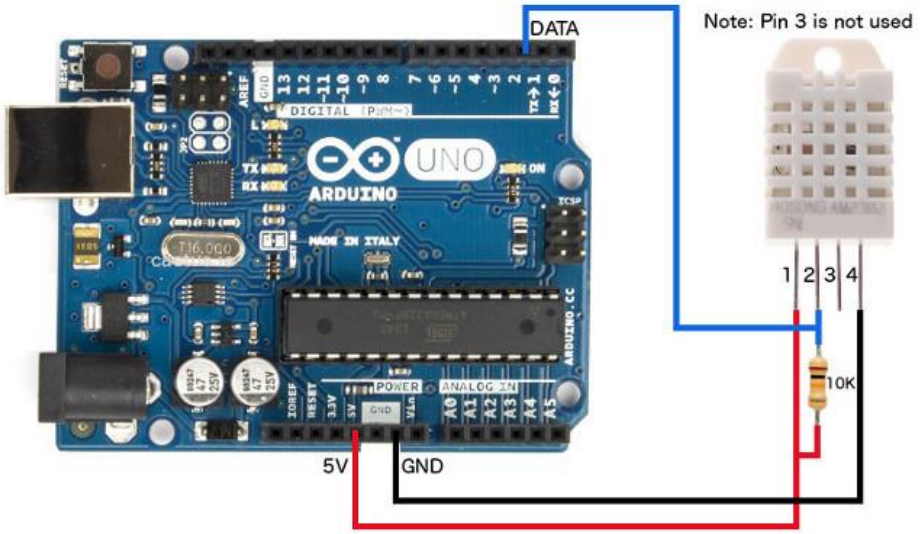
- **Define the DHT**
  DHT dht(DHTPIN, DHTTYPE);

- **Initiate the dht object**
  dht.begin(); // Initiates the DHT22 sensor

- **Read the Temperature**
  dht.readTemperature(); // Calls out the method from dht object

- **Read the Humidity**
  dht.readHumidity(); // Calls out the method from dht object

SCHEMATIC AND WORKING OF THE SENSOR



We are using DHT22 Temperature and Humidity sensor with Arduino UNO and getting its data from Arduino Serial Monitor. Its Temperature range is -40 ~ 80°C and Humidity range is 0 ~ 100%.

First pin is a VCC connect it to 5V. Second pin is data pin connect it to digital pin 7. And fourth pin is ground pin. 10k ohm resistor shown in the above picture is optional. For this program you can connect the circuit without resistor.

Model	DHT22
Power supply	3.3-6V DC
Output signal	digital signal via single-bus
Sensing element	Polymer capacitor
Operating range	humidity 0-100%RH; temperature -40~80Celsius
Accuracy	humidity +-2%RH(Max +-5%RH); temperature <+-0.5Celsius
Resolution or sensitivity	humidity 0.1%RH; temperature 0.1Celsius
Repeatability	humidity +-1%RH; temperature +-0.2Celsius
Humidity hysteresis	+-0.3%RH
Long-term Stability	+-0.5%RH/year
Sensing period	Average: 2s
Interchangeability	fully interchangeable
Dimensions	small size 14*18*5.5mm; big size 22*28*5mm

LAB TASKS

Q1) Develop the program to read the value of temperature in °C from DHT22 Temperature Sensor and display in on Serial Monitor. Capture it using snipping tool and add this image in your lab report.

Q2) Develop the program to read the value of temperature in °F and K from DHT22 Temperature Sensor and display in on Serial Monitor. Capture it using snipping tool and add this image in your lab report.

Q3) Design a temperature alarm system which alerts you on a particular temperature. The purpose is to simplify a real life problem of fire protection which gives you warning in the form of siren or light. Indicate the alarm with help of flashing LED as well as display on serial monitor. (Consider the warning temp = 15°C).

Q4) Develop the program to read the value of relative humidity in percentage from DHT22 Humidity Sensor and display in on Serial Monitor.

Q5) Write a program to read the value of Humidity in percentage along with Temperature in °C, °F and K from DHT22 Temperature & Humidity Sensor and display in on Serial Monitor. Capture it using snipping tool and add this image in your lab report.

Q6) Design a humidity level meter using DHT22 sensor which indicates you the range of humidity (0-100%) with the help of 5 LEDs. (Code is required with comment on each line along with the circuit diagram. Picture of the circuit and output on the serial monitor are not applicable in this task.)

POST LAB TASKS

Q1) Can we use DHT11 for this application? What is the temperature and humidity range of DHT11 and which one is better, DHT11 or DHT22?

Q2) What is datasheet? What meaningful information can you extract from the DHT22 datasheet that has been shared with you on LMS? Also mention who creates/publishes datasheets.

Q3) Define any practical application (excluding above) of Temperature Sensors where they can be used.

Q4) Define any practical application (excluding above) of Humidity Sensors where they can be used.