



# NAVODAYA INSTITUTE OF TECHNOLOGY, RAICHUR

## DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

### IOT Lab Program - 09

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#### 09 Develop a program to demonstrate weather station readings using Arduino.

##### Components Required

- Arduino Uno (or similar board)
  - DHT22 sensor (Temp + Humidity)
  - (Optional) BMP280/BMP180 (Pressure + Altitude)
  - Breadboard + jumper wires
  - 16×2 LCD (I<sup>2</sup>C version recommended) OR use Serial Monitor
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##### Working Principle

- **DHT22** measures **temperature & humidity** digitally.
  - **BMP280/BMP180** measures **pressure (hPa)** and can compute **altitude**.
  - Arduino reads the sensor data and displays it on **Serial Monitor** or **LCD screen**.
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##### Circuit Connections

###### DHT22

- VCC → 5V
- GND → GND
- DATA → D2 (with 10k pull-up to 5V if needed)

###### BMP280 (I<sup>2</sup>C type)

- VCC → 3.3V or 5V (depending on module)
- GND → GND
- SDA → A4 (Uno)
- SCL → A5 (Uno)

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## Steps to Do the Experiment

1. Connect the **DHT22** (and BMP280 if available) to Arduino.
  2. Install Arduino IDE libraries:
    - DHT sensor library by Adafruit
    - Adafruit BMP280 library (if using BMP280)
  3. Upload the sketch (below).
  4. Open **Serial Monitor @ 9600 baud**.
  5. Observe live readings:
    - Temperature (°C)
    - Humidity (%)
    - Pressure (hPa) & Altitude (m, if BMP280 used)
  6. (Optional) Display readings on **16×2 LCD** instead of Serial Monitor.
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### Arduino Program (DHT22 + BMP280 Weather Station)

```
#include "DHT.h"
#include <Adafruit_BMP280.h>

// --- DHT22 Settings ---
#define DHTPIN 2      // DHT22 data pin connected to D2
#define DHTTYPE DHT22
DHT dht(DHTPIN, DHTTYPE);

// --- BMP280 Settings ---
Adafruit_BMP280 bmp; // I2C interface

void setup() {
  Serial.begin(9600);
  Serial.println("Arduino Weather Station Starting...");

  dht.begin();

  if (!bmp.begin(0x76)) { // common I2C address 0x76 or 0x77
    Serial.println("BMP280 not found!");
    while (1);
  }
}

void loop() {
  // --- Read DHT22 ---
  float h = dht.readHumidity();
  float t = dht.readTemperature(); // Celsius
  float f = dht.readTemperature(true); // Fahrenheit

  // Check if readings failed
  if (isnan(h) || isnan(t)) {
    Serial.println("Failed to read from DHT sensor!");
    return;
  }

  // --- Read BMP280 ---
```

```
float pressure = bmp.readPressure() / 100.0F; // hPa  
float altitude = bmp.readAltitude(1013.25); // relative to sea level
```

```
// --- Display Data ---
```

```
Serial.print("Temp: "); Serial.print(t); Serial.print(" °C ");  
Serial.print("Humidity: "); Serial.print(h); Serial.print(" % ");  
Serial.print("Pressure: "); Serial.print(pressure); Serial.print(" hPa ");  
Serial.print("Altitude: "); Serial.print(altitude); Serial.println(" m");
```

```
delay(2000);
```

```
}
```

AVMPulse