# SMART AIR – Indoor Air Quality Monitoring System

## Project Overview:

SMART AIR is an IoT-based indoor environmental monitoring system designed to track and display real-time data on Air Quality Index (AQI), Temperature, and Humidity. The system is built using the ESP32 microcontroller, which not only gathers data from sensors but also transmits it to a cloud dashboard using Blynk IoT for remote monitoring on smartphones.  
  
The primary goal of this project is to help individuals keep track of the air quality and environmental conditions inside homes, offices, or classrooms to promote healthier indoor living.

## Key Features:

🡪Real-time monitoring of:  
- Air Quality Index (AQI)  
- Temperature (°C)  
- Humidity (%)  
  
🡪Display data on:  
- OLED screen (on-device display)  
- Blynk IoT mobile dashboard (Wi-Fi-based remote access)  
  
Simple, portable, and efficient indoor monitoring solution.

## Components Used:

|  |  |
| --- | --- |
| Component | Purpose |
| ESP32 Dev Board | Microcontroller with built-in Wi-Fi for IoT |
| DHT11 Sensor | Measures Temperature and Humidity |
| MQ135 Gas Sensor | Measures Air Quality (pollutant levels) |
| OLED Display (SSD1306 128x64) | Displays live environmental data |
| LED (optional) | Simulates air purifier or AQI alert visual |
| Jumper wires, Breadboard, USB cable | Basic wiring and connections |

## Software & Tools:

- Arduino IDE for programming the ESP32  
- Blynk IoT Platform for cloud dashboard and mobile monitoring  
- Libraries Used:  
 • Adafruit GFX & SSD1306  
 • DHT Sensor Library  
 • BlynkSimpleEsp32

## Working Principle:

1. The DHT11 sensor continuously measures temperature and humidity.  
2. The MQ135 sensor detects air pollution levels and an approximate AQI is calculated.  
3. All data is displayed on the OLED screen in real-time.  
4. Simultaneously, the data is sent over Wi-Fi to the Blynk IoT cloud, where it can be accessed from anywhere using the Blynk mobile app.

## Possible Extensions:

- Automatic Smart Air Purifier control based on AQI.  
- Cloud-based data logging and historical analysis.  
- Addition of more sensors for CO2, PM2.5, or VOC detection.