



# SENSORS FOR GREEN HOUSE APPLICATION MODEL-GRHOUSE100

This trainer has been designed with a view to provide practical and experimental knowledge Sensors programming for IoT based Green House Application with Arduino IOT Board.



## SPECIFICATIONS

### 1. Hardware

Following Parts and Modules are assembled on Single PCB of size - 18 Inch x 15 Inch

#### 1. Arduino Microcontroller Board

1. Arduino Uno Microcontroller board based on the ATMEGA328P
2. 14 Digital Input / Output pins (of which 6 provide PWM output)
3. 16 MHz Ceramic Resonator
4. Flash Memory : 16KB (of which 2KB used by boot loader)
5. USB Port
6. Power Jack – 9V DC, 1A

#### 2. Sensors & Other Components

1. CO2: Range: (0-2000ppm) Sensor
2. O2: Range: (0-25%) Sensor
3. Air Temperature & Humidity Sensor DHT11
4. Air Atmospheric Pressure Sensor BMP180
5. UV Index Sensor
6. Solar Radiation Sensor SDS011
7. VOC Gas Sensor
8. Soil Moisture Level Sensor
9. Soil Moisture Temperature Sensor
10. NO2 Sensor
11. Leaf Wetness Sensor

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**Dealer:-**

### 3. Modules and Hardware:

1. 20 X 4 - LCD Display
2. ESP32 Wifi Module
3. 2 mm interconnection Sockets

### 4. Application Software

1. Smart Dashboard for remote monitoring and analysis

### 2. Accessories

1. USB Cable : 1 No
2. Ethernet Cable : 1 No
3. Micro USB to USB cable for ESP32 : 1 No
4. Power Supply Adaptor : +9V DC, 1A
5. Jumper wires : 50 Nos.
6. Pen Drive with Software, Library, Driver, Codes, Soft Copy of Manual and Mobile App : 16 GB
7. Printed Practical Manual : 1 No.
8. E-Books for Agriculture IOT Subject : 10 Nos. in PDF Format
9. Mp4 Video Class for IOT Subject : 40 Nos
10. Excitation accessories for each sensor  
Plastic bag to store Co2  
Agarbatti and matchbox for smoke to test PM25 and Pm10  
Cigarette lighter to test for VOC Gas

### 3. Cabinet and PCB

The complete circuit diagram is screen printed on component side of the PCB with circuit and Parts at the same place. The PCB with components on front side is fitted in elegant wooden box having lock and key arrangement. The acrylic cover is fitted on PCB to safeguard parts. It works on 230 V AC Supply.

## EXPERIMENTS

### A. Theory Experiments for Arduino Board

1. To understand theory and working of Arduino Operating software.
2. To understand Pin and Connection Diagram of Arduino.
3. To understand USB Interface for Arduino.
4. To understand 20 x 4 LCD Display.

### B. Theory of ESP32 Wireless Module

5. To understand theory and working of ESP32
6. To understand Operating System for ESP32
7. To understand Pin and Connection Diagram of ESP32
8. To understand USB Interface for ESP32

### **C. Theory Experiments for Sensors**

9. To understand theory of Carbon Dioxide CO2 Sensor
10. To understand theory of Oxygen O2 Sensor
11. To understand theory of Air Humidity & Temperature Sensor DHT11
12. To understand theory of Atmospheric Pressure Sensor BMP180
13. To understand theory of Solar Radiation Sensor SDS011
14. To understand theory of UV Index Sensor
15. To understand theory of VOC Gas Sensor
16. To understand theory of Soil Moisture Sensor
17. To understand theory of Soil Temperature Sensor
18. To understand theory of NO2 Sensor
19. To understand theory of Leaf Wetness Sensor

### **D. Practical Experiments**

20. To measure CO2 PPM value using CO2 sensor
21. To measure Oxygen range using O2 sensor
22. To measure Air Humidity & Temperature using DHT11
23. To measure Atmospheric Pressure using BMP180 sensor
24. To measure Solar Radiation using Solar Radiation Sensor SDS011
25. To measure UV Index using UV Sensor
26. To measure level of VOC Gas using VOC Gas Sensor
27. To measure level of Soil Moisture using Soil Moisture Sensor
28. To measure Temperature of Soil Moisture using Temperature Sensor
29. To measure level of NO2 using NO2 Sensor
30. To measure level of Wetness of a Leaf using Leaf Wetness Sensor

### **E. Server, Cloud Configuration, IOT Gateway, Nodes and Mobile App Experiments**

31. To send Sensors data using Wifi Wireless Node to Main Base IOT Receiver
32. To send and display Sensors Data in a server Web Page using HTTP, Java and PHP Code
33. To send Sensors data to website webpage and store them into MySQL Server
34. To receive and show Sensors data on Android based Mobile App
35. To send and display Sensors Data on website Smart Dashboard on a server