



SENSORS FOR SMART ENVIRONMENT APPLICATION MODEL-SMARTENVIRON100

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



SPECIFICATIONS

1. Hardware

Following Parts 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. USB Port
5. 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. Atmospheric Pressure Sensor BMP180
5. PM2.5 and PM10 Air Quality Dust Pollution Sensor (UART and PWM output)
6. Solar Radiation Sensor SDS011
7. UV Index Sensor

3. Modules and Hardware:

1. 20 X 4 - LCD Display
2. ESP32 – Wifi Module
3. 2 mm interconnections

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Dealer:-

4. Application Software

1. Smart Dashboard for remote monitoring and analysis

2. Accessories

1. USB Cable : 2 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 IOT Subject : 10 Nos. in PDF Format
9. Mp4 Video Class for IOT Subject : 40 Nos
10. All above sensors in IP65 Box packing
11. Excitation accessories for each sensor
Plastic bag to store Co2
Agarbatti and matchbox for smoke to test PM25 and Pm10

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 Air Pollution Detection sensor PM2.5- PM10 Dust Sensor
14. To understand theory of Solar Radiation Sensor SDS011
15. To understand theory of UV Index Sensor

D. Practical Experiments

16. To measure CO2 PPM value using CO2 sensor
17. To measure Oxygen range using O2 sensor
18. To measure Air Humidity & Temperature using DHT11
19. To measure Atmospheric Pressure using BMP180 sensor
20. To measures Air Pollution Detection using PM2.5-PM10 Dust Sensor
21. To measure Solar Radiation using Solar Radiation Sensor SDS011
22. To measure UV Index using UV Sensor

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

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