



This trainer has been designed with a view to provide practical and experimental knowledge of Internet of Things (IOT) with Sensors programming with Arduino and Raspberry IOT Boards.

## **SPECIFICATIONS**

### **A. Main Specs**

1. Following Parts and Modules are assembled on Single PCB of size - 24 Inch x 20 Inch.
2. The complete circuit diagram is screen printed on component side of the PCB with circuit and Parts at the same place.
3. The PCB with components on front side is fitted in elegant wooden box having lock and key arrangement.
4. Modules and Parts should be removable without desodlring for easy repair / replacement
5. The acrylic cover is fitted on PCB to safeguard main parts.

### **B. Raspberry Microcontroller Board – Pi-4**

1. Processor : 64bit, ARMv7
2. RAM - 1 GB
3. Memory - 32GB
4. OS: Open Source Linux
5. Connectivity:  
Dual-Band 2.4/5.0 GHz Wireless LAN  
Bluetooth 5.0  
USB Interface – USB 2.0 – 2 Ports, USB 3.0 – 2 Ports,  
Gigabit Ethernet
6. Video and Sound  
2 × micro HDMI Interface ports (up to 4Kp60 supported)
7. Power - 5V, 3A DC via USB-C Connector

### **C. 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

#### **D. Sensors:**

1. RTD Temperature Sensor - RTD 100
2. NTC Thermistor Sensor
3. LM35 – Temperature Sensor
4. Photovoltaic Cell Sensor
5. Photo Light Sensor LDR
6. Air Humidity and Temperature Sensor – DHT11
7. Gas (Smoke) Detector Sensor - MQ2
8. Air Quality Sensor – MQ135
9. Atmospheric Pressure Sensor BMP180
10. Limit Switch
11. Capacitive Displacement Sensor - Capacitive Proximity Switch

#### **E. Modules and Hardware:**

1. 7" TFT LCD Display
2. LED Bar Graph
3. Buzzer
4. Touch Switch
5. 20 X 4 - LCD Display
6. Breadboard - 400 Points for making Amplifiers and Filter circuits as below  
Inverting, Non – Inverting, Power, Current, Instrumentation and Differential Amplifier, F to V, V to F, I to V, V to I Converter, High Pass and Low Pass Filter and Buffer Circuits to be made on Breadboard.
7. Different Resistors and LEDs
8. 2 mm interconnections

#### **F. Accessories**

1. All Cables and Adaptors and Excitation accessories for each sensor
2. Pen Drive : 16 GB with All Codes and Soft copy of Manual
3. E-Books for IOT Subject : 100 Nos. in PDF Format
4. Mp4 Video for IOT Subject : 100 Nos
5. Online Cloud/Server Services : For 2 Years on Cloud Server
6. Live Training at College : For 2 Days for 4 Hours per Day
7. After Sale Training support : By Online Zoom Meeting or By Whatsapp Video Call

## EXPERIMENTS

### A. Theory Experiments for Raspberry PI 4

1. To understand theory and working of Raspberry PI.
2. To understand Operating System for Raspberry PI.
3. To understand Communication Protocols - UART, I2C, SPI and Rs485.
4. To understand USB Interface for Raspberry PI.
5. To understand Ethernet Cable Interface for Raspberry PI
6. To understand micro SD Card Interface for Raspberry PI
7. To understand 20 x 4 LCD Display.
8. To understand 7 Inch Touch LCD Display.

### B. 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.

### C. Theory Experiments for Sensors

9. To understand theory of RTD
10. To understand theory of NTC Thermistor
11. To understand theory of LM35
12. To understand theory of Photovoltaic Photo Sensor - Photovoltaic Solar Cell
13. To understand theory of LDR
14. To understand theory of Air Humidity and Temperature Sensor
15. To understand theory of Gas (Smoke) Detector Sensor MQ2
16. To understand theory of Air Quality Sensor MQ135
17. To understand theory of Atmospheric Pressure Sensor BMP180
18. To understand theory of LED Bar Graph
19. To understand theory of Limit Switch
20. To understand theory of Capacitive Displacement Sensor - Proximity Switch
21. To understand theory of Touch Switch
22. To understand Buzzer

## **D. Practical Experiments**

23. To determine temperature using RTD sensor
24. To determine temperature using NTC Thermistor
25. To determine temperature using LM35
26. To measure Photo Voltaic Voltage using Photovoltaic Solar Cell
27. To detect the presence of Light using Photo Sensor LDR
28. To determine Air Humidity & Temperature using DHT11
29. To detect Gas and Smoke using MQ2 Sensor
30. To measure Air Quality using MQ135 Sensor
31. To determine Atmospheric pressure using BMP180 sensor
32. To control Limit Switch
33. To measure displacement using Capacitive Displacement Sensor Proximity switch
34. To identify the touch using Touch Capacitive Sensor TTP223
35. To make Buzzer buzz
36. To change LED Bar Graph based on changing analog values
37. To carry out experiment of Inverting Amplifier
38. To carry out experiment of Non – Inverting Amplifier
39. To carry out experiment of Power Amplifier
40. To carry out experiment of Current Amplifier
41. To carry out experiment of Instrumentation Amplifier
42. To carry out experiment of Differential Amplifier
43. To carry out experiment of F to V Converter
44. To carry out experiment of V to F Converter
45. To carry out experiment of I to V Converter
46. To carry out experiment of V to I Converter
47. To carry out experiment of High Pass Filter Circuit
48. To carry out experiment of Low Pass Filter Circuit
49. To carry out experiment of Buffer Circuit

## Contact us

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