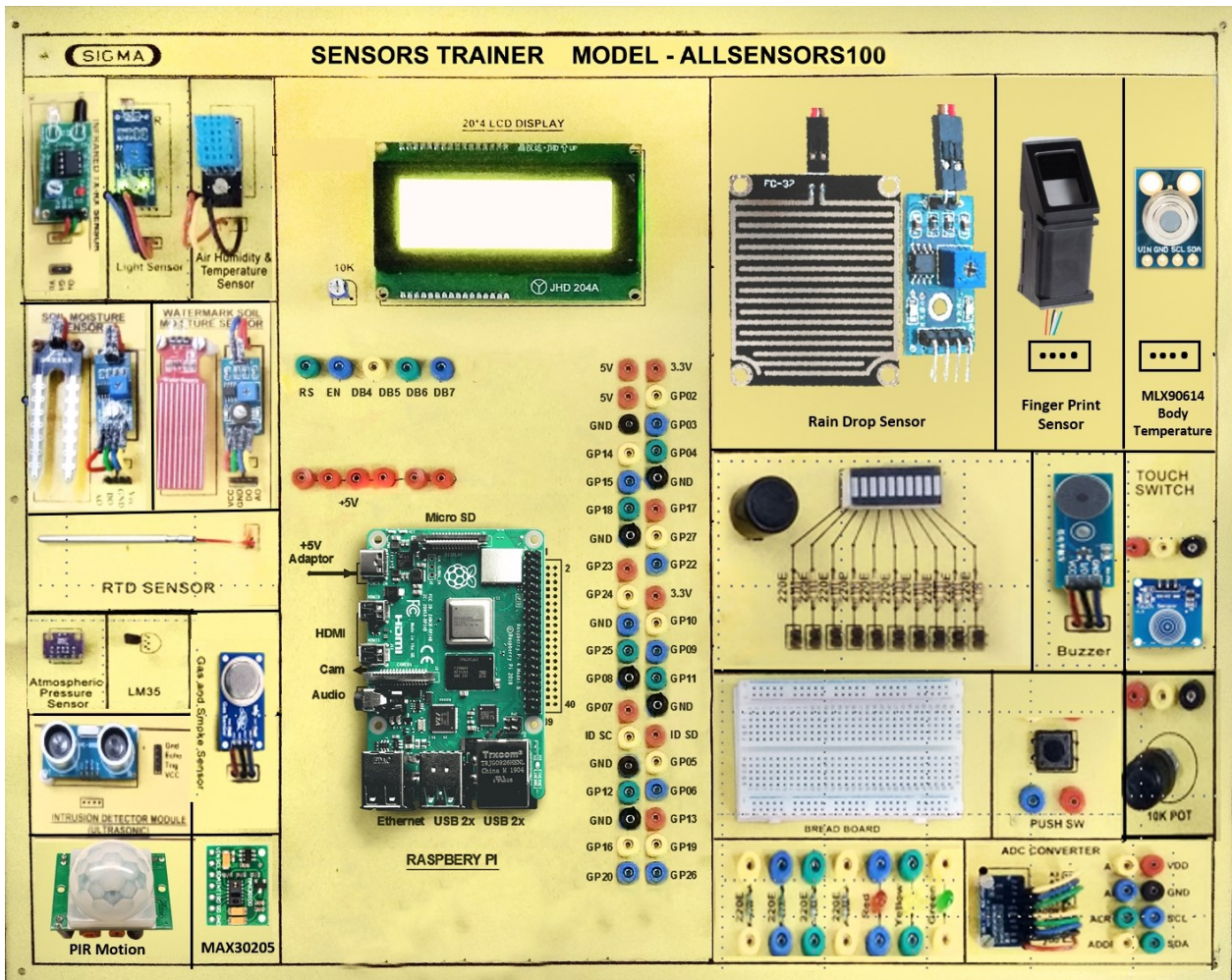# SIGMA

ALL SENSORS TRAINER

MODEL - ALLSENSORS100

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

SENSORS TRAINER   MODEL - ALLSENSORS100

SPECIFICATIONS

1. Hardware

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

1. Raspberry 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)

    2-lane MIPI DSI display port

    2-lane MIPI CSI camera port

    4-pole stereo audio and composite video port Output

7. Power - 5V, 3A DC via USB-C Connector

2. Sensors:

Home Sensors

1. Temperature & Humidity Sensor
2. Gas Sensor
3. Ultrasonic Object Distance Sensor
4. Motion Sensor - PIR

Industrial Sensors

5. IR Obstacle Sensor

6. Light LDR Sensor

7. Touch Switch Sensor

Agriculture Sensors

8. Soil Moisture Sensor

9. Water Level Sensor

10. Water Temperature RTD Sensor

11. Atmosphere Pressure Sensor

12. Atmosphere Temperature Sensor LM35

13. Raindrop Sensor

Medical Sensors

14. Human Body Temperature Sensor MLX90614

15. Pulse Oximeter Sensor - MAX30100

16. Finger Print Sensor

3. Modules and Hardware:

1. 20 X 4 - LCD Display

2. ADC Converter - ADS1115S - 1 Nos

3. LEDs and Different Resistors

4. Push Switches, Buzzer and 10K Potentiometer - 1 No each

5. Breadboard - 400 Points for making Amplifiers and Filter circuits

6. 2 mm interconnection Sockets - More than 100 nos.

2. Accessories

1.	Memory card	: 32 GB SD Card
2.	USB Cable	: 2 No
3.	Ethernet Cable	: 1 No
4.	HDMI Cable	: 1 No
5.	Power Supply Adaptor	: +5V DC, 3A - USB C Connector
6.	VGA to HDMI Converter Adaptor	: 1 No.
7.	Jumper wires -2 mm	: 50 Nos.
8.	Pen Derive with Software, Library, Driver, Codes, Soft Copy of Manual and Mobile App	: 16 GB
9.	Printed Practical Manual	: 1 No.
10.	E-Books for IOT Subject	: 10 Nos. in PDF Format
11.	Mp4 Video Class for IOT Subject	: 40 Nos
12.	Excitation accessories for each sensor	

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 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. Practical Experiments

1. To determine temperature and humidity sensor using DHT11
2. To detect gas and smoke in the atmosphere using Gas sensor
3. To determine the distance of a nearby object using ultrasonic sensor
4. To determine the nearby object motion using PIR motion sensor
5. To detect an object using IR object detection sensor
6. To detect light intensity using LDR sensor
7. To determine the touch using touch sensor
8. To determine relative moisture in soil using soil moisture sensor
9. To determine the level of water using water level sensor
10. To determine the water temperature using 1-Wire sensor
11. To determine the atmospheric pressure using BMP180 sensor
12. To determine the environment temperature using LM35 sensor
13. To determine the raindrops in the atmosphere using rain drop sensor
14. To determine the heart rate and pulse using MAX30100 Pulse Oximeter sensor
15. To calculate the body temperature using MLX90614 sensor
16. To register the fingerprint of a patient using fingerprint sensor
17. To match the stored fingerprint of a patient using fingerprint sensor