



This trainer has been designed with a view to provide practical and experimental knowledge of Wireless Internet of Things (IOT) with NodeMCU ESP8266 with Arduino IOT Board.

SPECIFICATIONS

A. Main Specs

1. Following Parts and Modules are assembled on Single PCB of size - 18 Inch x 15 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 desoldering for easy repair / replacement
5. The acrylic cover is fitted on PCB to safeguard main parts.

B. Arduino Microcontroller Board

1. ATmega328P Processor - AVR CPU at up to 16 MHz
2. 8 Bit AVR® RISC Based microcontroller
3. Memory : 32KB Flash, 2KB SRAM, 1KB EEPROM
4. Power On Reset (POR)
5. 2 x 8 Bit Timer/Counter
6. 1 x 16-bit Timer/Counter
7. USART, SPI, I2C
8. PWM Channels : 6 Nos.
9. Digital Input / Output pins : 14 Nos (of which 6 provide PWM output)
10. 16 MHz Ceramic Resonator
11. USB Port
12. Power Jack – 9V DC, 1A

C. Sensors:

1. Air Humidity and Temperature DHT11
2. Air Quality - MQ135
3. Soil / Water Temperature Sensor - DS18B20
4. Leaf Wetness Sensor - Rain Detector Sensor
5. Soil Moisture Sensor
6. Ambient Light Sensor - LDR Light Sensor

D. Modules and Hardware:

NodeMCU ESP8266 Module

1. Single or Dual-Core 32-bit LX6 Microprocessor with clock frequency up to 240 MHz.
2. 520 KB of SRAM, 448 KB of ROM and 16 KB of RTC SRAM.
3. Supports 802.11 b/g/n Wi-Fi connectivity with speeds up to 150 Mbps.
4. Support for both Classic Bluetooth v4.2 and BLE specifications.
5. 34 Programmable GPIOs.
6. Up to 18 channels of 12-bit SAR ADC and 2 channels of 8-bit DAC
7. Serial Connectivity include 4 x SPI, 2 x I2C, 2 x I2S, 3 x UART.
8. Ethernet MAC for physical LAN Communication (requires external PHY).
9. 1 Host controller for SD/SDIO/MMC and 1 Slave controller for SDIO/SPI.
10. Motor PWM and up to 16-channels of LED PWM.
11. Secure Boot and Flash Encryption.
12. Cryptographic Hardware Acceleration for AES, Hash (SHA-2), RSA, ECC and RNG.

E. Hardware:

1. 20 X 4 - LCD Display
2. LEDs and Different Resistors
3. 2 mm interconnection Sockets

F. Accessories

- | | |
|---------------------------------------------|-------------------------|
| 1. USB to Square USB Cable | : 1 No |
| 2. 2 mm Banana Jack Jumper – Connectors | : 30 Nos |
| 3. 9V, 1A Power Adaptor – Barrel 2.1mm | : 1 No |
| 4. Pen Drive - 16 GB with All Codes | : 1 No |
| 5. Printed Manual | : 1 No. |
| 6. Softcopy of Manual – On Pen Drive | : 1 No |
| 7. E-Books for IOT Subject – On Pen Drive | : 10 Nos. in PDF Format |
| 8. Mp4 Video for IOT Subject – On Pen Drive | : 40 Nos |

EXPERIMENTS

1. To understand theory and working of Arduino Board
2. To understand Operating System for Arduino Board
3. To understand Communication Protocols
4. To understand USB Interface for Arduino Board
5. To understand that how to connect 20 x 4 LCD Display to Arduino Board
6. To make LED blink
7. To connect LCD Display
8. To measure Humidity using Humidity - DHT11 Sensor
9. To measure Air Humidity and Temperature using DHT11 Sensor
10. To measure Air Quality using Air Quality Sensor
11. To measure Temperature of Soil using Soil Temperature Sensor - DS18B20
12. To measure wetness of Leaf using Leaf Wetness Sensor - Rain Detector Sensor
13. To measure Moisture of soil using Soil Moisture Sensor
14. To measure Ambient Light using LDR Light Sensor
15. To send Sensors data from Transmitter Node to Base Receiver using NodeMCU ESP8266 Wifi Gateway

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