

EXPERIMENT NO 5

AIM:

Connectivity of Node MCU with sensors.

THEORY:

A soil moisture sensor helps measure water content in soil, useful for automated irrigation systems. It works by detecting electrical conductivity through moisture. When soil is dry, resistance is high; when wet, resistance is low.

Connections with NodeMCU:

- **VCC** → 3.3V
- **GND** → GND
- **A0** → Analog pin (reads moisture level)

Working:

The sensor sends analog data to NodeMCU, which can be processed to trigger actions like turning on a pump or sending alerts via Wi-Fi.

Arduino Code:

```
// Define the pins
#define moisturePin A0 // Moisture sensor analog pin
#define ledPin D2      // Optional: To visualize the moisture level (LED)

void setup() {
  Serial.begin(115200); // Initialize serial communication at 115200 baud rate
  pinMode(ledPin, OUTPUT); // Optional: Set an LED pin for output (if desired)
  digitalWrite(ledPin, LOW); // Make sure the LED is off initially
}

void loop() {
  // Read the raw moisture sensor value from A0 pin
  int sensorValue = analogRead(moisturePin);

  // Debugging: print the raw sensor value to Serial Monitor
  Serial.print("Raw Sensor Value: ");
  Serial.println(sensorValue);

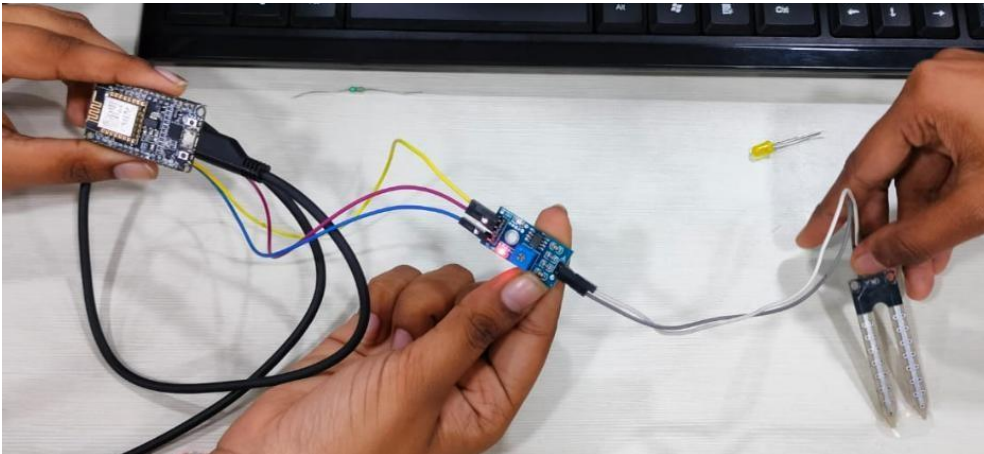
  // Map the sensor value to a moisture percentage
  int moistureLevel = map(sensorValue, 0, 1023, 100, 0); // Map it to a moisture percentage (0-100)

  // Debugging: print the mapped moisture level
  Serial.print("Moisture Level: ");
  Serial.print(moistureLevel); // Print the moisture level in percentage
  Serial.println("%");

  // Optional: If moisture is low, turn on an LED (visual indication)
  if (moistureLevel < 30) {
    digitalWrite(ledPin, HIGH); // Turn on the LED if soil is too dry
  } else {
    digitalWrite(ledPin, LOW); // Turn off the LED if moisture is sufficient
  }

  delay(1000); // Wait for a second before taking another reading
}
```

Circuit:



Output:

```
Output  Serial Monitor X
Message (Enter to send message to 'NodeMCU 1.0 (ESP-12E Module)' on 'COM8')
10:37:23.357 -> Raw Sensor Value: 1024
10:37:23.357 -> Moisture Level: 1%
10:37:24.331 -> Raw Sensor Value: 1024
10:37:24.378 -> Moisture Level: 1%
10:37:25.332 -> Raw Sensor Value: 1024
10:37:25.376 -> Moisture Level: 1%
10:37:26.356 -> Raw Sensor Value: 1024
10:37:26.356 -> Moisture Level: 1%
10:37:27.353 -> Raw Sensor Value: 1024
10:37:27.353 -> Moisture Level: 1%
10:37:28.332 -> Raw Sensor Value: 1017
10:37:28.378 -> Moisture Level: 2%
10:37:29.375 -> Raw Sensor Value: 991
10:37:29.375 -> Moisture Level: 4%
10:37:30.332 -> Raw Sensor Value: 985
10:37:30.376 -> Moisture Level: 5%
10:37:31.332 -> Raw Sensor Value: 985
10:37:31.379 -> Moisture Level: 5%
10:37:32.332 -> Raw Sensor Value: 1024
10:37:32.377 -> Moisture Level: 1%
10:37:33.379 -> Raw Sensor Value: 1024
10:37:33.379 -> Moisture Level: 1%
10:37:34.332 -> Raw Sensor Value: 1024
10:37:34.375 -> Moisture Level: 1%
```

Conclusion:

We successfully connected the NodeMCU with a soil moisture sensor and an LED, enabling real-time soil moisture detection and automated responses.

LO Mapped : LO2