Connect Shiksha IoT Academy

15-Day IoT & Robotics Program

Transforming Engineering Students into IoT Professionals

Day 4: LDR Sensor + LED Automation using NodeMCU

Step 1: Connect the LDR Sensor

Components Needed:

- 1x LDR
- 1x 10kΩ Resistor
- Breadboard
- Jumper wires
- NodeMCU (ESP8266)

Connections:

- One leg of LDR → **3.3V**
- Other leg of LDR → **A0 (Analog pin)**
- **10kΩ Resistor** → Between LDR's second leg and **GND**

This forms a **voltage divider** that sends analog values to the A0 pin.

Step 2: Read Light Value from LDR

Code:

```
void setup() {
  Serial.begin(115200);  // Start Serial Monitor
}
```

```
void loop() {
  int ldrValue = analogRead(A0);  // Read analog value from LDR
  Serial.print("LDR Value: ");
  Serial.println(ldrValue);
  delay(500);  // Delay for better readability
}
```

Upload the code and open the **Serial Monitor** (115200 baud).
You will see the **light intensity value** changing when you cover or uncover the LDR.

Step 3: Connect the LED

Additional Component:

- 1x LED

Connections:

- LED Anode (+) → **D2 (GPIO 4)**
- LED Cathode (–) → **GND**

Step 4: Automate LED Based on Light

Now we combine both – the LDR reads light levels and the LED turns ON/OFF based on it.

Final Code:

```
const int ledPin = D2;
const int ldrPin = A0;

void setup() {
  pinMode(ledPin, OUTPUT);
  Serial.begin(115200);
}

void loop() {
  int ldrValue = analogRead(ldrPin);
  Serial.print("LDR Value: ");
  Serial.println(ldrValue);

  if (ldrValue < 500) {  // Dark environment
```

```
    digitalWrite(ledPin, HIGH);  // Turn on LED
  } else {
    digitalWrite(ledPin, LOW);   // Turn off LED
  }

  delay(500);
}
```

Key Concepts Explained

- **LDR**: Sensor that detects light. Resistance decreases with more light.
- **Voltage Divider**: Converts changing resistance into a voltage the ESP8266 can read.
- **A0 Pin**: NodeMCU's analog input pin (reads values from 0–1023).
- **LED Control**: LED turns on when light is low, turns off when it's bright.
