Project Report

Course Title: **Digital Electronics LAB**

Course Code: **CSE 213**

Sections: **M**

Submitted To:

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1. **Project Name: Arduino Based Soil Moisture Measurement.**

2. **Description:** This project is a part of a Smart Farming Project where soil moisture level is very important for plant. In this project we use soil moisture sensor with Arduino Microcontroller and display the percentage of Moisture in a 16X2 LCD Display. In this project we use resistive soil moisture sensor which is continues read the moisture in soil and transfer this data to Arduino and then Arduino process the data and output the data with LCD Display.

3. **Equipment :**
   1. Arduino Uno
   2. Soil Moisture Sensor
   3. Jumper wires (generic)
   4. Breadboard (generic)
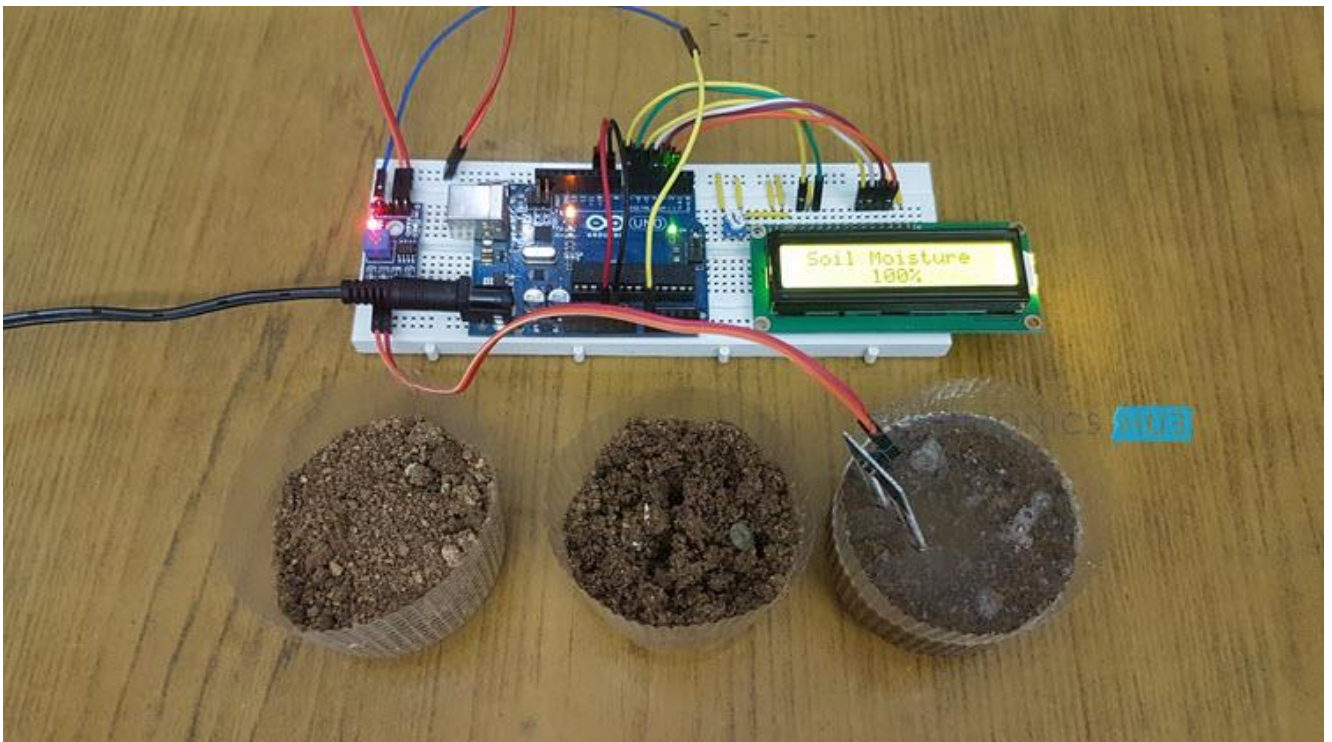   5. 16X2 LCD Display
   6. I2C LCD Adapter Module

4. **Diagram:**

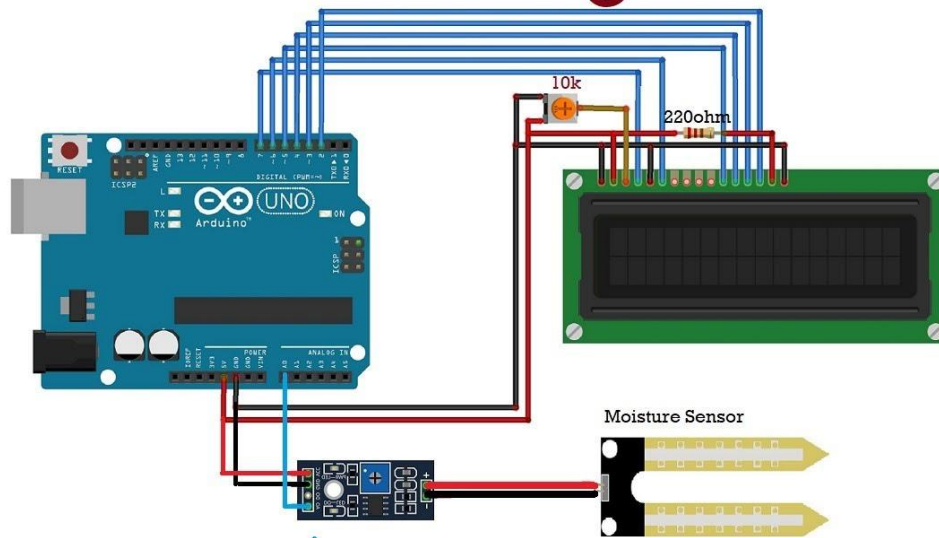*Figure 1 : Soil Moisture Measurement*

Circuit Diagram

Figure 2: Circuit Diagram

Code:

```cpp
1 #include <Wire.h>
2 #include <LiquidCrystal_I2C.h>
3
4 // Set the LCD address to 0×27 for a 16 chars and 2 line display
5 LiquidCrystal_I2C lcd(0×27, 16, 2);
6
7 int sensorPin = A0;
8 int sensorValue = 0;
9 int percentValue = 0;
10
11 void setup()
12 {
13     Serial.begin(9600);
14     lcd.begin();
15     lcd.backlight();
16 }
17
18 void loop()
19 {
20   sensorValue = analogRead(sensorPin);
21   Serial.print("\n\nAnalog Value: ");
22   Serial.print(sensorValue);
23
24   percentValue = map(sensorValue, 1023, 200, 0, 100);
25   Serial.print("\nPercentValue: ");
26   Serial.print(percentValue);
27   Serial.print("%");
28   lcd.setCursor(0, 0);
29   lcd.print("Soil Moisture");
30
31   lcd.setCursor(0, 1);
32   lcd.print("Percent: ");
33   lcd.print(percentValue);
34   lcd.print("%");
35   delay(1000);
36   lcd.clear();
37 }
```

5. **Advantages:**
   a. Easy to use
   b. Cost Effective
   c. Expandable
   d. It delivers the results immediately.
   e. Offers accurate results.

6. **Disadvantages:**
   a. Need some Technical Skills to Operate
   b. Might be Costly
   c. Mechanical Part so may be damage any time
   d. Sensors provide less accuracy in sandy soils due to large particles.

7. **Time:** 2 Hours to connect all modules.

8. **Cost:**
   a. Arduino Uno   450 BDT
   b. Soil Moisture Sensor   180 BDT
   c. Jumper wires (generic)   20 BDT
   d. Breadboard (generic) X 2   160 BDT
   e. 16X2 LCD Display   350 BDT
   f. I2C LCD Adapter Module   180 BDT

   Total Cost = 1,340 BDT

9. **Future Plan:**
   This is a part of Smart Framing Project which is an IOT bases Project so in Future we add some Wi-Fi module that send Moisture level alert on web service and it send to our mobile. One mobile application which is control whole farming process with one click. We collect data from farm and analysis with machine learning algorithms. We also provide a data visualization on that data on real time so any one can easily access and take action on behave on data.

   Thanks you.