```cpp
#include <SoftwareSerial.h>

#include <LiquidCrystal.h>

LiquidCrystal lcd(13, 12, 6, 5, 4, 3);

float t=0;

char data = 0;

// replace with your channel's thingspeak API key

String apiKey = "8NBNB4VQ9F2EEWQM";

// connect 10 to TX of Serial USB

// connect 11 to RX of serial USB

SoftwareSerial ser(10,11); // RX, TX

// this runs once

void setup()

{

    // enable debug serial
```

```
//Serial.begin(9600);

// enable software serial

ser.begin(9600);

lcd.begin(16, 2);


lcd.setCursor(0,0);

lcd.print("Engineers Garage");

lcd.setCursor(0,1);

lcd.print("                 ");

delay(3000);


lcd.clear();

lcd.setCursor(0,0);

lcd.print("    IOT AIR");

lcd.setCursor(0,1);

lcd.print("QUALITY MONITOR");

delay(3000);
```

```cpp
  // pinMode(12, INPUT);


  // reset ESP8266 WiFi connection AT+CIPMUX=1 AT+CWJA

  ser.println("AT");

  delay(1000);

  ser.println("AT+GMR");

  delay(1000);

  ser.println("AT+CWMODE=3");

  delay(1000);

  ser.println("AT+RST");

  delay(5000);

  ser.println("AT+CIPMUX=1");

  delay(1000);

  String  cmd="AT+CWJAP="EngineersGarage","egP@$$w0rd?
"";

  ser.println(cmd);

  delay(1000);
```

```arduino
  ser.println("AT+CIFSR");

  delay(1000);

  lcd.clear();

  lcd.setCursor(0,0);

  lcd.print("      WIFI");

  lcd.setCursor(0,1);

  lcd.print("   CONNECTED");

 }


// the loop

void loop()

{

  delay(1000);

  t = analogRead(A0);

  Serial.print("Airquality = ");

  Serial.println(t);
```

```
    lcd.clear();

    lcd.setCursor(0,0);

    lcd.print("  SENDING DATA");

    lcd.setCursor(0,1);

    lcd.print("    TO CLOUD");

    esp_8266();


}


void esp_8266()

{

    // TCP connection AT+CIPSTART=4,"TCP","184.106.153.
149",80

        String cmd = "AT+CIPSTART=4,"TCP","";

        cmd += "184.106.153.149"; // api.thingspeak.com

        cmd += "",80";

        ser.println(cmd);
```

```
    Serial.println(cmd);

    if(ser.find("Error"))

    {

        Serial.println("AT+CIPSTART error");

        return;

    }


    // prepare GET string GET https://api.thingspeak.
com/update?api_key=LHAG4NSIYJ5UWS6U&field1=0rnrn

    String getStr = "GET /update?api_key=";

    getStr += apiKey;

    //getStr +="&field1=";

    //getStr +=String(h);

    getStr +="&field1=";

    getStr +=String(t);

    getStr += "rnrn";

    // send data length
```

```
    cmd = "AT+CIPSEND=4,";

    cmd += String(getStr.length());

    ser.println(cmd);

    Serial.println(cmd);

    delay(1000);

    ser.print(getStr);

    Serial.println(getStr);


    // thingspeak needs 15 sec delay between updates

    delay(16000);

}
```