

LAMPIRAN

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#include <ESP8266WiFi.h>

#include <ESP8266HTTPClient.h>

#include <WiFiClientSecure.h>

#include <Wire.h>

#include <LiquidCrystal_I2C.h>

#include <OneWire.h>

#include <DallasTemperature.h>

#include <time.h>

#define TURBIDITY_PIN A0

#define SAMPLE_COUNT 10

#define BUTTON_PIN D5

#define ONE_WIRE_BUS D6

// ===== WIFI =====

const char* ssid = "001";

const char* password = "1spasi23";

// ===== ULTRAMSG =====

String instance_id = "instance160698";

String token = "4hckzaiwgbfxhohz";

// ===== NOMOR TUJUAN =====

String daftarNomor[] = {
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"6282369212551",
"6282210090440"
};

int jumlahNomor = 2;

// ===== NAMA KOLAM =====
String namaKolam = "Kolam Ikan";

// ===== NTP =====
const char* ntpServer = "pool.ntp.org";
const long  gmtOffset_sec = 25200;
const int  daylightOffset_sec = 0;

// ===== KALIBRASI TURBIDITY (TIDAK DIUBAH) =====
int adc_jernih = 746;
int adc_keruh = 560;

LiquidCrystal_I2C lcd(0x27, 16, 2);
OneWire oneWire(ONE_WIRE_BUS);
DallasTemperature sensors(&oneWire);

// ===== STATUS =====
bool sensorActive = false;
bool lastButtonState = HIGH;
unsigned long buttonPressTime = 0;
bool notifTer kirim = false;
bool notifSuhuTinggi = false;

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bool notifSuhuRendah = false;

bool notifGabungan = false;

// ===== TAMBAHAN FITUR JADWAL =====

bool laporanPagiTer kirim = false;

bool laporanSoreTer kirim = false;

// ===== FUNGSI WAKTU =====

String getWaktu() {
    struct tm timeinfo;
    if (!getLocalTime(&timeinfo)) return "-";
    char buffer[25];
    strftime(buffer, sizeof(buffer), "%d-%m-%Y %H:%M:%S", &timeinfo);
    return String(buffer);
}

// ===== FUNGSI WHATSAPP =====

void kirimWhatsApp(String pesan) {

    if (WiFi.status() != WL_CONNECTED) return;

    for (int i = 0; i < jumlahNomor; i++) {

        WiFiClientSecure client;
        client.setInsecure();

        HTTPClient http;

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String url = "https://api.ultramsmsg.com/" + instance_id + "/messages/chat";

http.begin(client, url);

http.addHeader("Content-Type", "application/x-www-form-urlencoded");

String data = "token=" + token +
              "&to=" + daftarNomor[i] +
              "&body=" + pesan;

http.POST(data);

http.end();

delay(800);
}
}

// ===== FITUR LAPORAN TERJADWAL =====

void cekLaporanTerjadwal(float ntu, float suhu, String statusAir) {

    struct tm timeinfo;

    if (!getLocalTime(&timeinfo)) return;

    int jam = timeinfo.tm_hour;

    int menit = timeinfo.tm_min;

    // ===== JAM 08:00 =====

    if (jam == 8 && menit == 0 && !laporanPagiTer kirim) {

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String pesan = "□ LAPORAN PAGI\n";
pesan += "□ " + namaKolam + "\n";
pesan += "□ " + getWaktu() + "\n\n";
pesan += "□ Status: " + statusAir + "\n";
pesan += "□ NTU: " + String(ntu,0) + " NTU\n";
pesan += "□ Suhu: " + String(suhu,1) + " °C\n\n";
pesan += "Monitoring otomatis sistem.";

    kirimWhatsApp(pesan);

    laporanPagiTer kirim = true;
}

if (jam != 8) laporanPagiTer kirim = false;

// ===== JAM 16:00 =====

if (jam == 18 && menit == 0 && !laporanSoreTer kirim) {

    String pesan = "□ LAPORAN SORE\n";
    pesan += "□ " + namaKolam + "\n";
    pesan += "□ " + getWaktu() + "\n\n";
    pesan += "□ Status: " + statusAir + "\n";
    pesan += "□ NTU: " + String(ntu,0) + " NTU\n";
    pesan += "□ Suhu: " + String(suhu,1) + " °C\n\n";
    pesan += "Monitoring otomatis sistem.";

    kirimWhatsApp(pesan);

    laporanSoreTer kirim = true;
}

```

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}

if (jam != 18) laporanSoreTer kirim = false;
}

void setup() {

  Serial.begin(115200);

  pinMode(BUTTON_PIN, INPUT_PULLUP);

  lcd.init();

  lcd.backlight();

  sensors.begin();

  sensors.setResolution(12);

  lcd.setCursor(0,0);

  lcd.print("Connecting WiFi");

  WiFi.begin(ssid, password);

  while (WiFi.status() != WL_CONNECTED) {
    delay(400);
    Serial.print(".");
  }

  configTime(gmtOffset_sec, daylightOffset_sec, ntpServer);

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lcd.clear();

lcd.print("WiFi Connected");

delay(1200);

lcd.clear();

lcd.print("Mode: Non Aktif");

lcd.setCursor(0,1);

lcd.print("Tekan Untuk ON");
}

void loop() {

bool reading = digitalRead(BUTTON_PIN);

if (reading == LOW && lastButtonState == HIGH) {
    buttonPressTime = millis();
}

if (reading == HIGH && lastButtonState == LOW) {

unsigned long pressDuration = millis() - buttonPressTime;

if (pressDuration >= 2000) {
    sensorActive = false;
    notifTer kirim = false;
    notifSuhuTinggi = false;
}
}
}

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    notifSuhuRendah = false;

    notifGabungan = false;

    lcd.clear();

    lcd.print("Mode: Non Aktif");

    lcd.setCursor(0,1);

    lcd.print("Tekan untuk ON");

}

else {

    sensorActive = true;

    lcd.clear();

}

}

lastButtonState = reading;

if (sensorActive) {

    // ===== TURBIDITY =====

    long sum = 0;

    for (int i = 0; i < SAMPLE_COUNT; i++) {

        sum += analogRead(TURBIDITY_PIN);

        delay(8);

    }

    float adc = sum / (float)SAMPLE_COUNT;

    float ntu = map(adc, adc_keruh, adc_jernih, 1000, 0);

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if (ntu < 0) ntu = 0;

if (ntu > 1000) ntu = 1000;

// ===== SUHU =====

float totalSuhu = 0;

int validRead = 0;

for (int i = 0; i < 3; i++) {

    sensors.requestTemperatures();

    delay(750);

    float t = sensors.getTempCByIndex(0);

    if (t != DEVICE_DISCONNECTED_C) {

        totalSuhu += t;

        validRead++;

    }

}

float suhu = (validRead > 0) ? totalSuhu / validRead : 0;

// ===== STATUS AIR =====

String statusAir;

if (ntu < 200) statusAir = "Jernih";

else if (ntu > 400) statusAir = "Keruh";

else statusAir = "Normal";

// ===== LCD =====

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lcd.setCursor(0,0);

lcd.print("NTU:");

lcd.print(ntu,0);

lcd.print(" ");

lcd.print(statusAir);

lcd.print(" ");

lcd.setCursor(0,1);

lcd.print("Suhu:");

lcd.print(suhu,1);

lcd.print("C ");

Serial.print("NTU: ");

Serial.print(ntu);

Serial.print(" | Status: ");

Serial.print(statusAir);

Serial.print(" | Suhu: ");

Serial.println(suhu);

// ===== CEK LAPORAN TERJADWAL (FITUR TAMBAHAN) =====

cekLaporanTerjadwal(ntu, suhu, statusAir);

// ===== NOTIFIKASI LAMA (TIDAK DIUBAH) =====

if (ntu > 400 && suhu > 32 && !notifGabungan) {

String pesan = "⏏ PERINGATAN KRITIS ⏏\n"; pesan
+= "⏏ " + namaKolam + "\n";

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pesan += "□ " + getWaktu() + "\n\n";

pesan += "□ Status: Air Keruh\n";

pesan += "□ NTU: " + String(ntu,0) + " NTU\n";

pesan += "□ Suhu: " + String(suhu,1) + " °C\n\n";

pesan += "Segera lakukan tindakan pengecekan menyeluruh!";

    kirimWhatsApp(pesan);

    notifGabungan = true;

    notifTer kirim = true;

    notifSuhuTinggi = true;

}

if (!(ntu > 400 && suhu > 32)) notifGabungan = false;

if (ntu > 400 && !notifTer kirim && !notifGabungan) {

    String pesan = "□ PERINGATAN KUALITAS AIR □\n";

    pesan += "□ " + namaKolam + "\n";

    pesan += "□ " + getWaktu() + "\n\n";

    pesan += "□ NTU: " + String(ntu,0) + " NTU\n";

    pesan += "□ Suhu: " + String(suhu,1) + " °C\n\n";

    pesan += "Segera lakukan pengecekan dan penggantian air.";

    kirimWhatsApp(pesan);

    notifTer kirim = true;

}

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```
if (ntu <= 400) notifTer kirim = false;
```

```
if (suhu > 32 && !notifSuhuTinggi && !notifGabungan) {
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    String pesan = "☐ SUHU AIR TERLALU TINGGI ☐\n"; pesan
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```
    += "☐ " + namaKolam + "\n";
```

```
    pesan += "☐ " + getWaktu() + "\n\n";
```

```
    pesan += "☐ Suhu: " + String(suhu,1) + " °C\n\n";
```

```
    pesan += "Periksa sistem sirkulasi atau pendinginan kolam.";
```

```
    kirimWhatsApp(pesan);
```

```
    notifSuhuTinggi = true;
```

```
}
```

```
if (suhu <= 32) notifSuhuTinggi = false;
```

```
if (suhu < 15 && !notifSuhuRendah) {
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```
    String pesan = "✳☐ SUHU AIR TERLALU RENDAH ✳☐\n"; pesan
```

```
    += "☐ " + namaKolam + "\n";
```

```
    pesan += "☐ " + getWaktu() + "\n\n";
```

```
    pesan += "☐ Suhu: " + String(suhu,1) + " °C\n\n";
```

```
    pesan += "Lakukan penyesuaian suhu kolam.";
```

```
    kirimWhatsApp(pesan);
```

```
    notifSuhuRendah = true;
```

```
}  
  
if (suhu >= 15) notifSuhuRendah = false;  
  
    delay(1000);  
}  
}
```