Day 2: Sensors and Communication

Welcome to day two of our IoT workshop series! Today we will read a value from a soil moisture sensor, see it in the Serial Monitor, connect our board to WiFi, and finally send a message to an MQTT broker.

We are using the **Arduino framework inside PlatformIO** throughout this workshop.

1. How a Capacitive Soil Moisture Sensor Works

A capacitive soil moisture sensor measures how much water is in the soil by detecting changes in **capacitance** around its probe. Water and dry soil store electrical charge differently, so as the soil gets wetter, the capacitance the sensor measures changes. The sensor turns this into an **analog voltage**: drier soil and wetter soil produce different voltage levels, which our ESP32 can read.

Unlike older resistive sensors, the capacitive type has **no exposed metal electrodes** touching the soil. This means it does not corrode nearly as quickly, making it much better suited for long-term use.

We are using the **DFRobot Analog Capacitive Soil Moisture Sensor**.

PLACEHOLDER — Insert a photo of the DFRobot capacitive soil moisture sensor here.

2. Connecting the Sensor to the DOIT ESP32

The sensor has three wires:

Sensor Pin	Connects to ESP32	Purpose
VCC (red)	VIN (5V) or 3V3	Power
GND (black)	GND	Ground
AOUT (blue)	An analog-capable GPIO (e.g. GPIO34)	Analog signal out

A few notes:

- The signal wire goes to an **analog input pin**. On the DOIT ESP32 DevKit, pins like **GPIO34, GPIO35, GPIO32, GPIO33** work well for analog reading.
- The sensor can run on either **3V3** or **5V**. The **VIN** pin on the DOIT ESP32 provides 5V (when the board is powered over USB).
- **Important:** the ESP32's analog pins can only safely read up to ~3.3V. If you power the sensor from 5V, its output range is higher, so be aware the readings will scale differently — and never feed more than 3.3V into a GPIO pin.
- Double-check GND is shared between the sensor and the board.

<wrap em> PLACEHOLDER — Insert the wiring diagram / photo showing

From:
https://wiki.eolab.de/ - **HSRW EOLab Wiki**

Permanent link:
https://wiki.eolab.de/doku.php?id=inhabitat:kaunas:day02&rev=1780038117

Last update: **2026/05/29 09:01**