

Smart Irrigation System Using Arduino

◇ Aim of the Project

The aim of this project is to **automatically irrigate plants** by detecting the soil moisture level using a sensor and controlling a water pump. This helps in **saving water** and reduces manual effort.

◇ Components Used

1. **Arduino UNO** – Controls the entire system
2. **Soil Moisture Sensor** – Measures the moisture level of the soil
3. **Relay Module (1 Channel)** – Switches the water pump safely
4. **DC Water Pump** – Supplies water to plants
5. **Breadboard** – For easy circuit connections
6. **Jumper Wires** – Used for wiring
7. **External Power Supply** – Provides power to the water pump

◇ Connections

- Arduino **5V** is connected to the **breadboard positive line**
- Arduino **GND** is connected to the **breadboard ground line**

Soil Moisture Sensor:

- VCC → Breadboard +
- GND → Breadboard –
- AO → Arduino A0

Relay Module:

- VCC → Breadboard +
- GND → Breadboard –
- IN → Arduino Digital Pin 7

Water Pump (through relay):

- External supply + → Relay NO
- Relay COM → Pump +
- Pump – → External supply –

◇ Project Explanation (Working)

The soil moisture sensor continuously checks the moisture content of the soil and sends an analog signal to the Arduino. The Arduino compares this value with predefined limits. When the soil is dry, the Arduino activates the relay, which turns ON the water pump and supplies water to the plants. When the soil becomes wet, the Arduino turns OFF the relay and stops the pump. If the sensor is in air, the pump remains OFF for safety.

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