



# ELECTRICAL ENGINEERING DEPARTMENT

## COLLEGE OF ENGINEERING AND SCIENCES

### FINAL YEAR PROJECT



**SUPERVISOR:**  
**Engr. Osama Mahfooz**

**PROJECT:**  
**Smart Waste-Water Treatment Plant System**

**GROUP MEMBERS:**  
**Kelash**  
**Farhan Ahmed Khushik**  
**Muhammad Rashid**

#### ABSTRACT

❖ The process of eliminating impurities from the water and making it safe drinking water is termed as waste-water treatment. The water is purified by passing it through different stages those are sediment filter, HP pump and RO membrane by localizing different valves, transmitters and sensors (water level and water flow), finally the quality of output of water check through pH sensor. Particularly, water level in a specified tank and the flow rate of that water is monitored and measured respectively during run while, maintaining the quality (PH) of final product. By centralizing control operations near the process plant and allowing for remote monitoring and supervision, the system concept improves dependability and reduces maintenance and operational costs. This technique can be used in both all sorts of businesses.

#### INTRODUCTION

- ❖ **Waste-Water Treatment Plant** is the process of eliminating impurities from the water and making it safe drinking water.
- ❖ The physical infrastructure for waste-water treatment is referred to as a "Waste-Water Treatment Plant" (WWTP).
- ❖ **RO Membrane** is a water purification process that uses a partially permeable membrane to separate ions, unwanted molecules and larger particles from drinking water.
- ❖ "Smart waste-water treatment plant which is a system that controls the plant electronically by using several control loops along with automated controllers spread over the whole system.
- ❖ The goal of this research is to implement a cost-effective waste-water treatment plant to recycle the available water, remove contaminants (poisonous substance) from water and convert it into safe pure drinking water.

#### PROBLEM STATEMENT

- ❖ Lack of IoT based health monitoring system for proactive maintenance of the RO plant and sea water treatment plant. Data logging of the maintenance record is not available in the water treatment plants currently available in the market. Water quality is compromised in traditional treatment plants because the TDS of water close to 1000 is difficult to achieve without complete monitoring on each stage.

#### PROJECT COMPONENTS

- ❖ **Hardware:**
  - **RO Membrane:** It is a water purification device that uses a partially permeable membrane to separate ions, unwanted molecules and larger particles from drinking water.
  - **High Pressure (HP) Pump:** These pumps generate the operating pressure and supply water to the spraying device.
  - **Arduino UNO:** The Arduino Uno is an open-source microcontroller board based on the Microchip ATmega328P microcontroller.
  - **Water Level Sensors:** These sensors are used to detect the level of substances that can flow.
- **Software:**
  - **Arduino IDE:** Used to write and upload programs to Arduino compatible boards.

#### BLOCK DIAGRAM

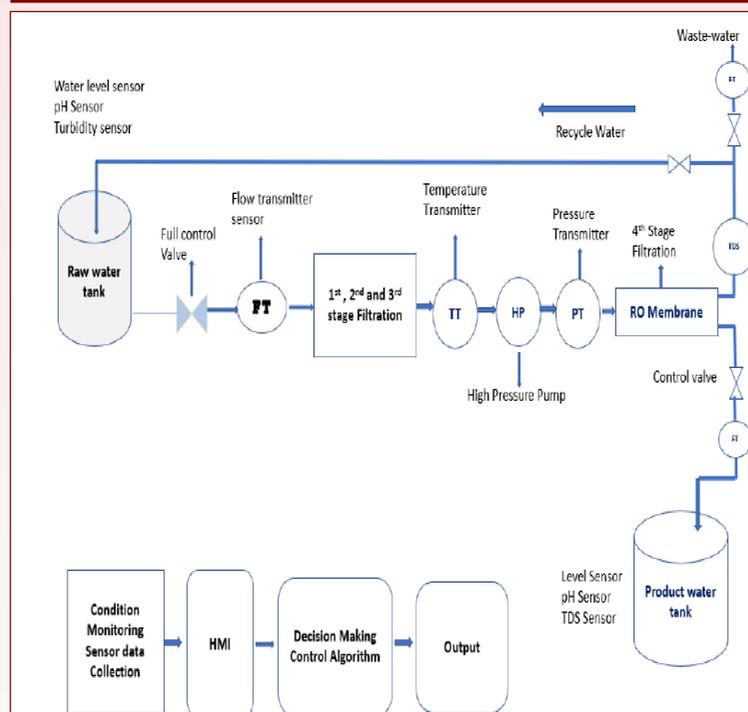


Figure 01: Block diagram of Waste-Water Treatment Plant

#### IMPACT & RESULTS (SDGS, CEPS)

- ❖ **CEP Attributes:**
  - ❖ **Depth of Engineering Knowledge :** Sediment filters and 0.0001-micron pore size RO membrane, water level sensor K0123, HP pump of 130 PSI, and water flow sensor YF-S201, Temperature sensor (DS18B20). HP pumps are used to provide pressure to perform the water treatment functions.
  - ❖ **Depth of Analysis :** The system is introduced which monitors the plant. Analysis is required to make the project sustainable and cost-effective.
  - ❖ Results can be achieved more quickly, even in certain cases in real-time. When employing traditional methodology, the amount of work does not change with the complexity or duration of the act to the same extent.

#### ❖ UNSDG Compliance:



Sustainable Development Goals 6 and 15

