

BATCH :1

DAY :5 LAB REPORT

WATER QUALITY DETECTION USING RASPBERRY PI PICO W AND TURBIDITY SENSOR

OBJECTIVE :

To detect the water quality value by using the NTU value

Components used :

- i. Raspberry pi pico w
- ii. Turbidity sensor
- iii. Female connector
- iv. Usb cable

Software used : thonny app

Block diagram :

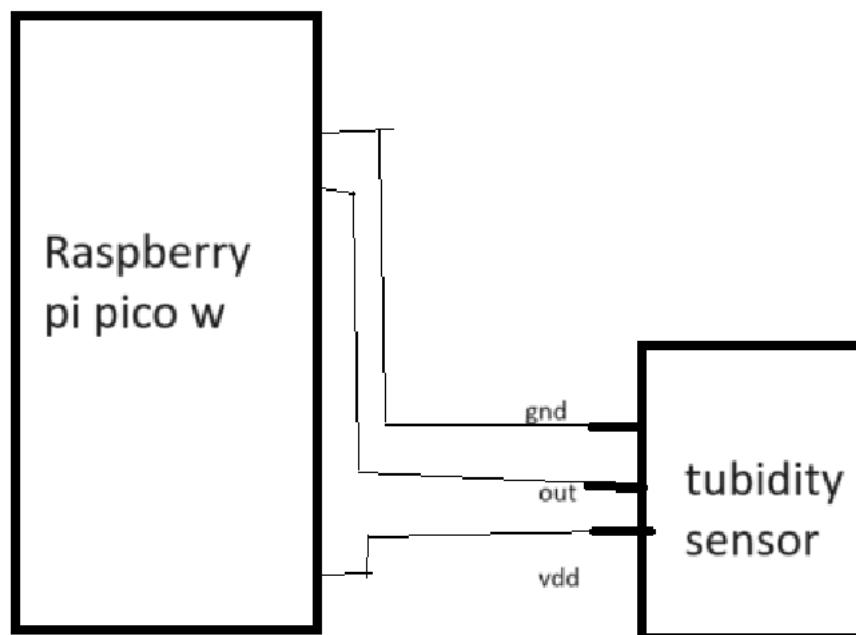


Fig: block diagram

Code:

```
from machine import ADC, Pin
import time

# Initialize the ADC (Analog to Digital Converter) on Pin A0
sensor_pin = ADC(Pin(26)) # GPIO26 corresponds to ADC0

# Configure the serial communication (UART0)
uart = machine.UART(0, baudrate=9600)

def setup():
    uart.init(9600, bits=8, parity=None, stop=1)

def loop():
    while True:
        # Read the sensor value
        sensor_value = sensor_pin.read_u16() # 16-bit ADC read
        # Convert to voltage (assuming a reference voltage of 3.3V)
        voltage = sensor_value * (3.3 / 65535) # 65535 is the max value for 16-bit ADC

        # Print the voltage to the serial monitor
        uart.write("Sensor Output (V):\n")
        uart.write("{:.2f}\n\n".format(voltage))

        # Delay for 1 second
        time.sleep(1)

# Run the setup function once
setup()

# Enter the loop function
loop()
```

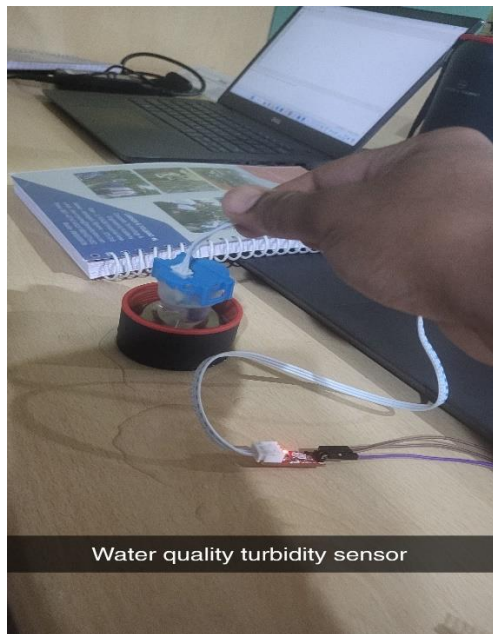


Fig : turbidity detection

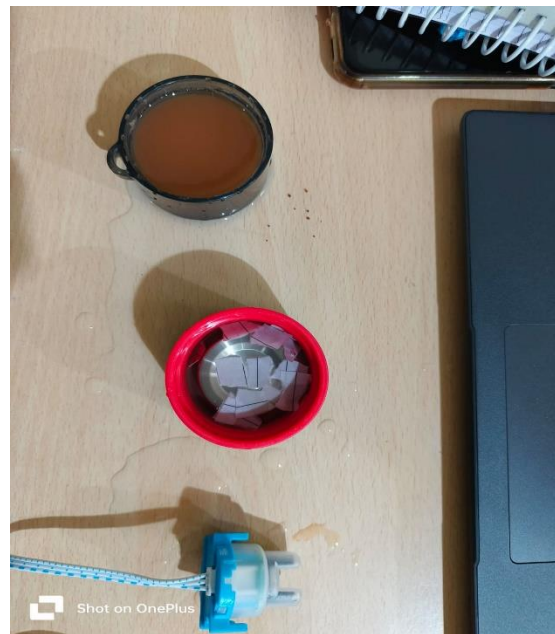


fig: different quality of water

```

Thonny - C:\Users\Admin\Desktop\TURBIDITY.py @ 16:1
File Edit View Run Tools Help

Files x
  This computer
  C:\Users\Admin
  Contacts
  Desktop
  Documents
  Downloads
  Favorites
  Links
  Music
  OneDrive
  Pictures
  project_1
  project_2
  Saved Games
  Searches
  STM32CubeIDE
  Videos

Raspberry Pi Pico
  LED_blinking.py
  LED_wifi.py
  secrets.py
  Temperature_sensor.py
  turbidity.py

TURBIDITY.py x
1 from machine import ADC, Pin
2 import time
3
4 # Define the ADC pin (GP26 is ADC0 on Pico W)
5 turbidity_sensor = ADC(Pin(26))
6
7 # Function to read turbidity sensor and convert to NTU
8 def read_turbidity():
9     # Read analog value (0-65535)
10    raw_value = turbidity_sensor.read_u16()
11    # Convert raw value to voltage (0-3.3V)
12    voltage = (raw_value / 65535) * 3.3
13    # Convert voltage to NTU (example conversion, adjust based on your sensor's datasheet)
14    # For a TSD-10 sensor, the relationship might be linear or require a specific formula
15    # NTU = (voltage * scale_factor) + offset
16    # You need to calibrate this based on your sensor's datasheet
17    ntu = voltage * 10 # Example scale factor
18    return ntu
19
20 # Main loop to continuously read and display NTU value
21 while True:
22     ntu = read_turbidity()
23     print(f'Turbidity (NTU): {ntu}')

Shell x
Turbidity (NTU): 16.26
Turbidity (NTU): 18.51
Turbidity (NTU): 16.03
Turbidity (NTU): 16.20
Turbidity (NTU): 16.00
Turbidity (NTU): 16.05
Turbidity (NTU): 18.41

MicroPython (Raspberry Pi Pico) • Board CDC @ COM9
  
```

Fig: Result of turbidity detection of different water quality

