**Practical 04**

**Raspberry Pi Based Oscilloscope**

import time

import matplotlib.pyplot as plt

from adafruit\_ads1x15.analog\_in import AnalogIn

import adafruit\_ads1x15.ads1115 as ADS

import board

import busio

# Initialize I2C and ADS1115

i2c = busio.I2C(board.SCL, board.SDA)

ads = ADS.ADS1115(i2c)

chan = AnalogIn(ads, ADS.P0) # Read from A0

# For live graph

plt.ion()

fig, ax = plt.subplots()

x\_data = []

y\_data = []

line, = ax.plot(x\_data, y\_data)

ax.set\_title("Live Sensor Data (ADS1115)")

ax.set\_xlabel("Time (s)")

ax.set\_ylabel("Voltage (V)")

start\_time = time.time()

try:

while True:

voltage = chan.voltage

elapsed = time.time() - start\_time

x\_data.append(elapsed)

y\_data.append(voltage)

# Keep only last 100 readings for speed

if len(x\_data) > 100:

x\_data = x\_data[-100:]

y\_data = y\_data[-100:]

line.set\_xdata(x\_data)

line.set\_ydata(y\_data)

ax.relim()

ax.autoscale\_view()

plt.pause(0.05)

print(f"Voltage: {voltage:.3f} V")

time.sleep(0.1)

except KeyboardInterrupt:

print("Stopped by user.")

**Output:**

