

Akoua Orsot

Prof. Linda Vanasupa, Prof. Brad Minch

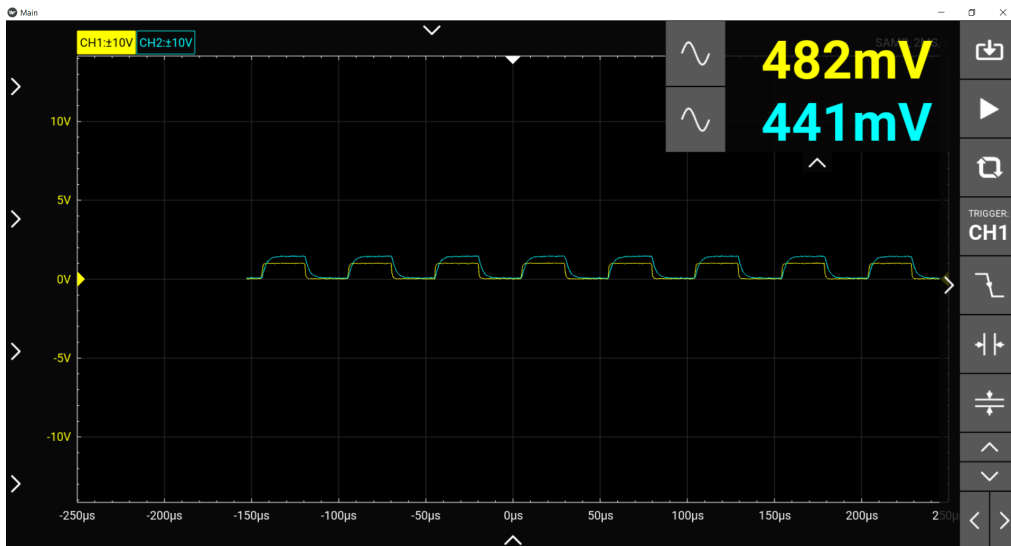
ENGR1125-02

March 25th, 2022

Lab 4 Report

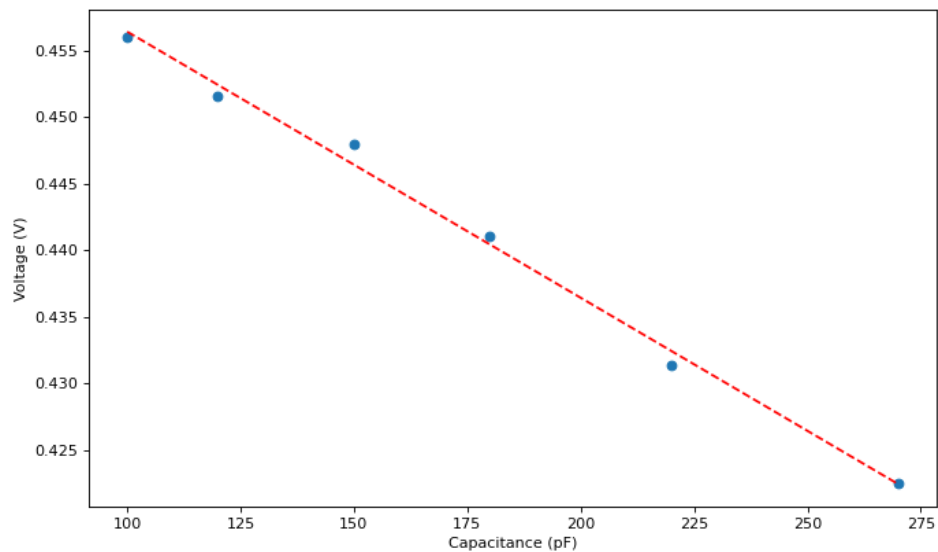
1.

A capacitor of 180pF was used to measure the change in voltage

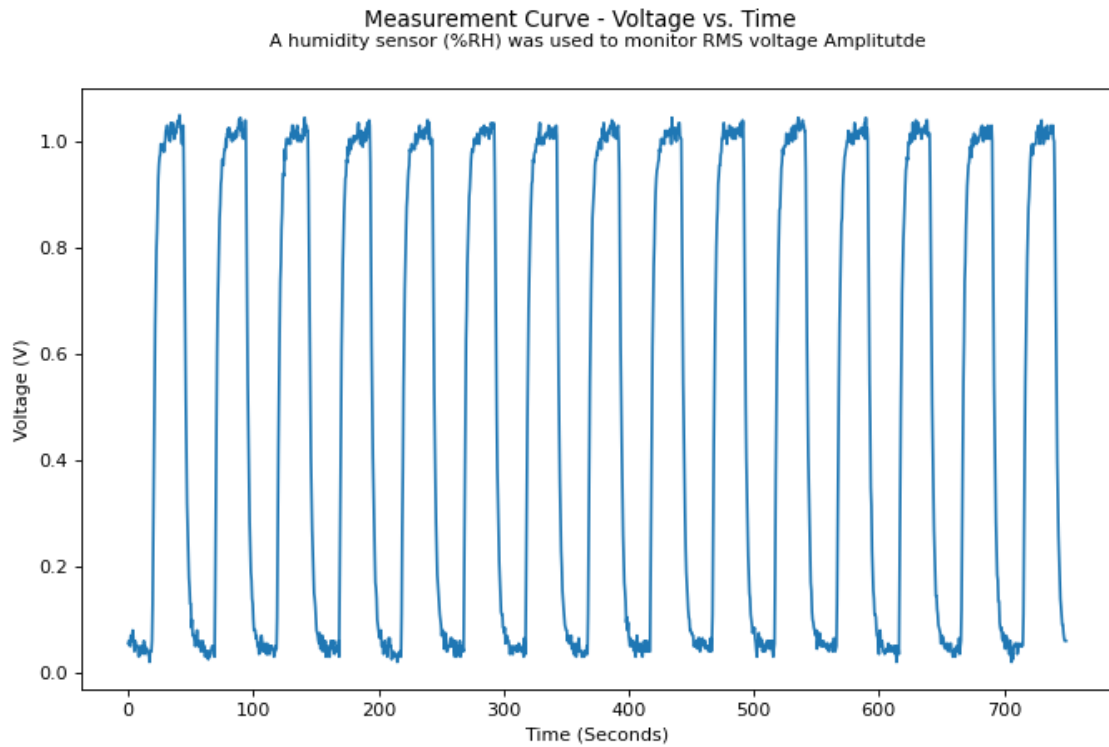


2.

Circuit Calibration - Capacitance vs. Voltage
6 different capacitors were used to monitor RMS voltage Amplitude



3.



4. Your measurement of % relative humidity and reflections on whether it is a reasonable result.

The calibration curve linear best fit line equation is:

$$V = -0.00020C + 0.47640 \rightarrow C = -5000V + 2382$$

The relationship of the humidity sensor's capacitance to % relative humidity is:

$$RH(X) = -3465.6X^3 + 10732X^2 - 10457X + 3245.9$$

Replacing X with $[C(\text{read}) / C@55\%RH]$, equivalent to $C / 180$ per the datasheet:

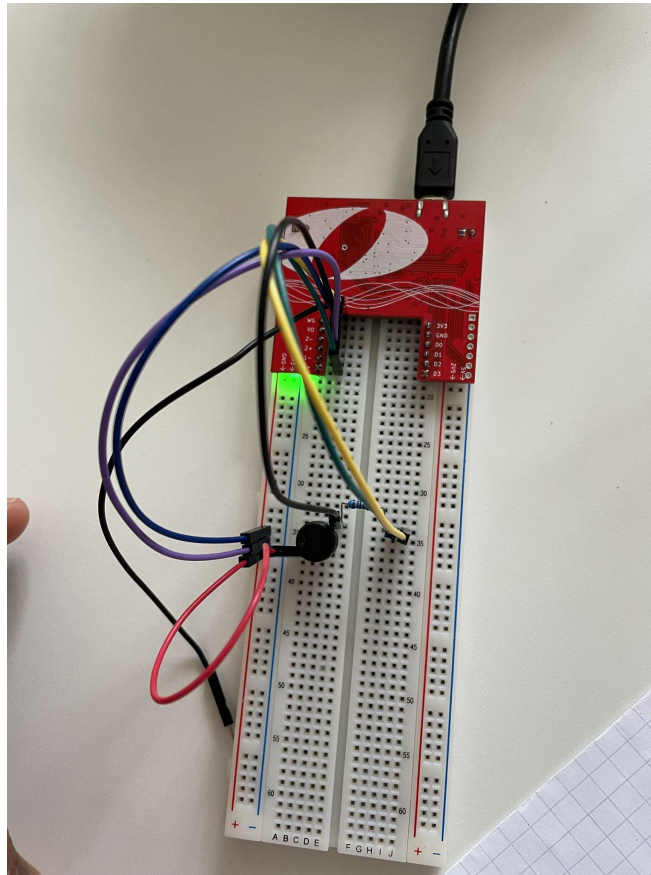
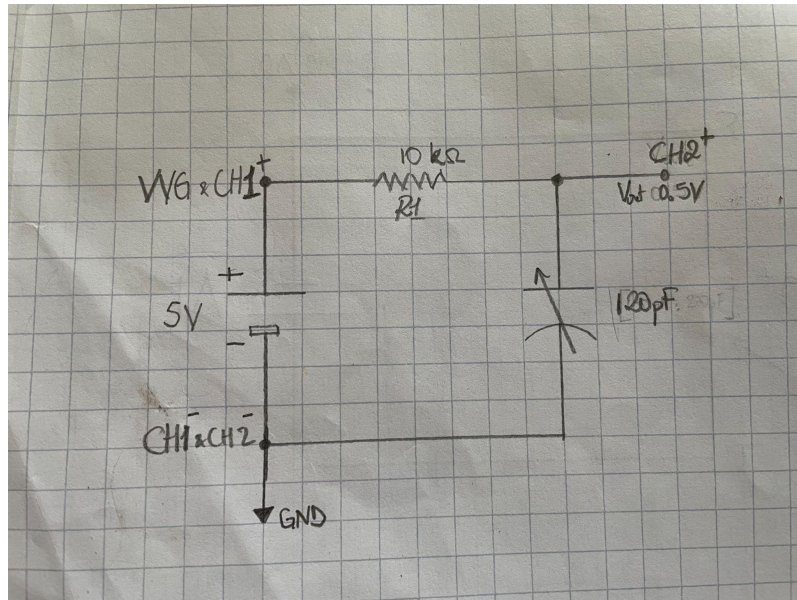
$$R(C) = -0.000594239C^3 + 0.331235C^2 - 58.0944C + 3245.9$$

$$\text{Solving for the \% RH: } R(C(V = 0.441)) = R(177) = 45.26\%$$

It remains consistent with the outside humidity at approximately 48%.

5.

Note: The circuit is identical when replacing the capacitor with the sensor.



6. Please see the code attached.