# The University of Vermont

**Semiconductor Materials and Devices**

**EE 3440/5440**
**PHYS 3675/5675**

Lab 0                    Python Setup and Data Visualization                    Due 1/29/24 at 1am

## Introduction

This guide will walk you through some introductory activities to help you prepare for analysis of measurement data later in the semester, including setting up python, installing libraries, and analyzing some example data.

## Procedure

1.  Install Pycharm (and python if required) on your PC OR, following the instructions at https://www.uvm.edu/it/kb/article/vmware-horizon-client/, log in to virtual votey through either the browser or desktop client. If you do not have access, please let me know so that I can request it.
2.  Open Pycharm and create a new project, with a new python virtual environment.
3.  Transfer the requirements.txt, lab0.py and data.txt files to the Pycharm project directory. If using virtual votey, the file transfer window can be opened from the toolbar available at the left side of the screen.
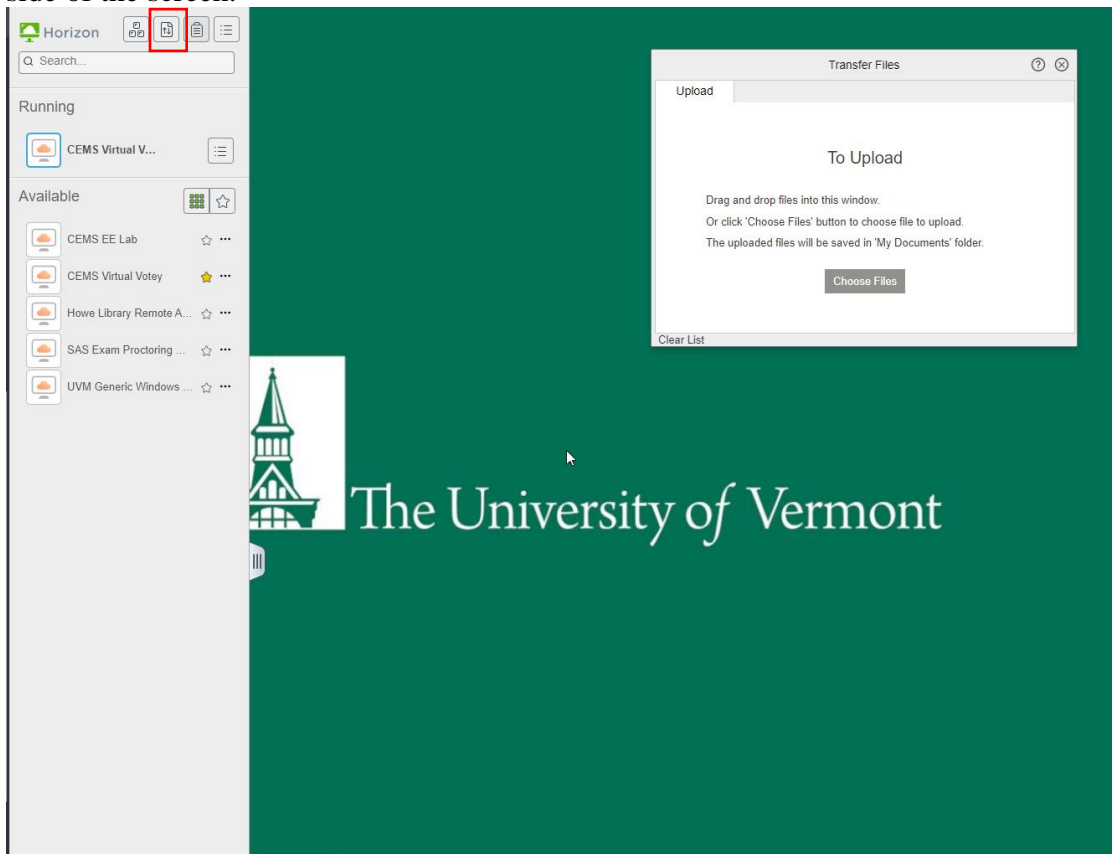


4.  In the <u>terminal</u> window of pycharm (lower left), run "pip install -r requirements.txt" This will install libraries used in this activity that are not included in the default python installation.

5.  The test.txt file includes some example data taken from a test instrument you will be using this semester. The pandas library is utilized to import data from a variety of sources such as CSV files. Referring to the *pandas.read_csv()* documentation, adjust input parameters to import the data file. You may have to do minor additional processing after import. Your resulting data should look similar to that below.

```
          V2            I2    V3
NO.
1.0   0.0 -9.766500e-07  0.0
2.0  -0.1 -1.129200e-05  0.0
3.0  -0.2 -1.248500e-05  0.0
4.0  -0.3 -1.180100e-05  0.0
5.0  -0.4 -1.227500e-05  0.0
6.0  -0.5 -1.255700e-05  0.0
```

6.  Plot the data in two views, with current I2 on the y-axis and voltage V2 or V3 on the x-axis, depending on the plot. For the plot of V2 vs I2, color your data by value of V3. Scale your data so that it is in engineering notation and label your axis with units (volts and amperes). The matplotlib documentation may be helpful in performing these plot customizations.

## Writeup

1.  Save your figures (as image files) and associated code and upload them in a zip file to Brightspace. I should be able to run your code and replicate the figures provided.