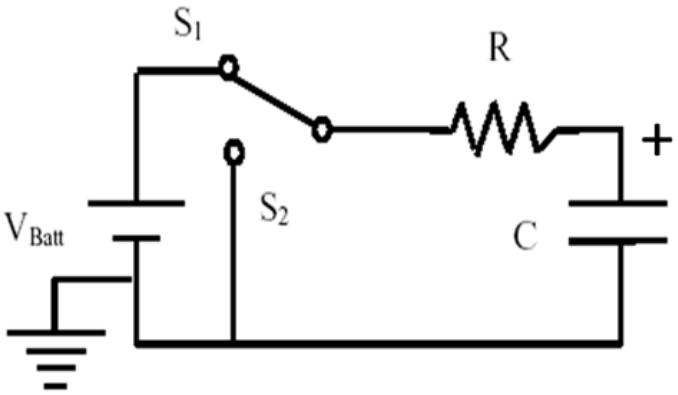
Class Assignment

Due on Thursday 29 October 2020

- For this you will need to use MATLAB. You can use the ECE Computer Cluster if you have not downloaded MATLAB to your own computer. You are to use MATLAB and the matlab plotting file that I provided to you on Canvas. Modify the **PlottingTemplate.m** file to plot the voltage across a Capacitor during its charging cycle (See Lecture Notes). Assume that the Capacitor has zero charge to start.



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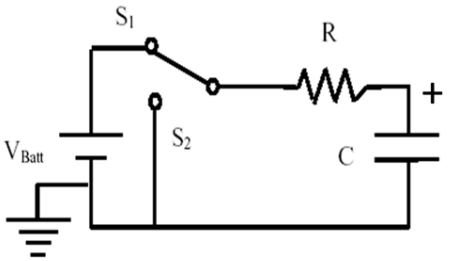

You **MUST** Do **ALL** the Following For this Assignment

- For this problem let the Battery Voltage be 100 volts, R=1000 ohms, and C=10 microfarads.
  - What is the Time Constant for this circuit?
  - Assume that the switch is closed at time = 0 with capacitor charge at zero
  - Make a plot of the voltage across the capacitor for time = 0 to 80 mili-seconds
  - Set the vertical axis for 0 to 110 and the horizontal axis from 0 to 0.08
  - Label your vertical axis as “Capacitor Voltage”
  - Label your horizontal axis as “Time in seconds”
  - Title the plot as “Capacitor Charging”
  - Use the “grid” command in MATLAB to show your grid lines on your plot
  - Now keeping everything the same change the capacitance and plot the result
    - Do this for C= 8microfarads, 5 microfarads, and 2 microfarads
    - Figure out how to plot them all on the same plot
      - Explain what you observe in your plot and how it relates to the time constant
    - For each Capacitance value figure out how long it takes the Capacitor to reach 90 percent of full charge value. Explain how your answers relate to the time constant of the circuit
  - Produce a professional document for your submission
    - Mark of a good submission is that any other student could take your submission, comprehend it, be able to recreate your results, and learn from it

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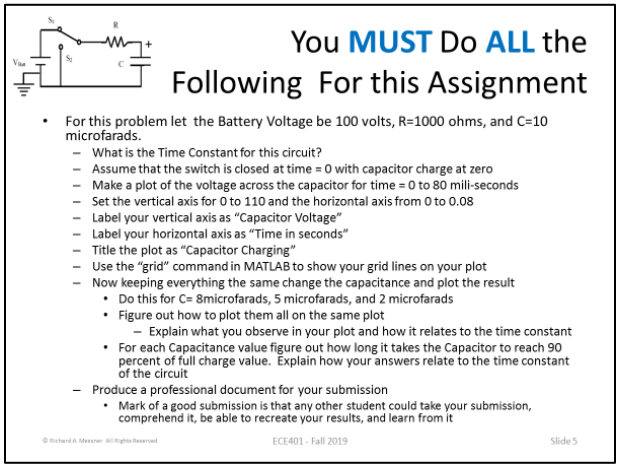

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What you need to do!

- Prepare a professional document that includes all the items outlined in the last slide
- **MUST ALL BE DONE ELECTRONICALLY**
  - i.e., Word processed, sniping tool, MATLAB, embedding plots, etc.
- Include your ***COMMENTED*** MATLAB code and a conclusion section that enumerates what you can conclude regarding the assignment and what you learned **(THIS IS NOT A ONE SENTENCE SECTION!!!!!)**
- You are to upload an electronic version to Canvas
- You **MUST INCLUDE** your **MATLAB .m** file! **(THIS IS IN ADDTION TO THE CODE THAT YOU PUT IN YOUR WORD-PROCESSED SUBMISSION!!!!!)**
- **THE ONLY ACCEPTABLE DOCUMENTS FOR UPLOAD ARE:** WORD .doc or .docx FILES and MATLAB .m FILES

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