

EEL 3112C: Circuits-II Lab

Fall 2019

Objective

In this lab exercise, students should come up with two different ways to design a high pass filter with a cutoff frequency of 4kHz (i.e. the pass band starts at 4 kHz). You may choose any passive components to build the circuits, and use appropriate laboratory equipment to test your circuit.

Design Guidelines

Your design process should undergo following steps:

- 1) *Theoretical analysis:*
 - a) Choose a circuit configuration (with passive components) and identify the input and output in your circuit.
 - b) Circuit schematic
 - c) Calculate the values of the passive components needed for your design.
 - d) The transfer function in terms of circuit components
- 2) *Simulation:*
 - a) Simulate the above designed circuit using calculated values to see if your design meets specifications.
- 3) *Realization:*
 - a) Build a prototype and take appropriate measurements.
 - b) Compare real and calculated values of the chosen circuit components.
 - c) Simulate your circuit using the real values.
- 4) *Documentation:*
 - a) After the experiment, please submit a report of your findings. The instructions for your report are given below.

Report Guidelines

The purpose of this extra assignment is to demonstrate the ability of students to **design and conduct experiments, and interpret the collected data in a scientific way.**

Please make sure to answer all sections in the following templates and provide all the details necessary to demonstrate the intermediate steps to achieve the goal of the assignment.

- A. List of lab equipment used to conduct the experiment (e.g. Oscilloscope, Network Analyzer, DMM, etc.)

- B. List the circuit components, and their values when applicable, needed for the design (e.g. $10\text{ k}\Omega$ resistor, $10\text{ }\mu\text{F}$ capacitor, etc.)
- C. Theoretical results (Equations, Circuit analysis, etc.)
- D. Simulation schematic & results
- E. Experimental results (Measurements, Plots, Tables, etc.)
- F. Conclusion (Interpret experimental data, and explain differences and similarities between simulation and experimental results)