ECE 317
Lab. Assignment #5

Objective:
The objective of this laboratory is to design and simulate active filters.

Design assignment #1
It is required to design an active first order lowpass filter to meet the following specifications:
   a) Cutoff frequency of 2 kHz.
   b) The input impedance $Z_i > 10 \, \text{k}\Omega$.
   c) A dc magnitude response of 5.
   d) Verify your design using Pspice by plotting the magnitude response (in dB) and the phase response in degrees.
   e) Find the magnitude and phase responses at $f = 10 \, \text{kHz}$.

Design assignment #2
Design a third order lowpass filter to pass the frequency band described by $0 \leq f \leq 4 \, \text{kHz}$.
   a) Assume an appropriate cutoff frequency. Justify your choice.
   b) Give the complete design of the filter using 10 nF capacitors. Hence, verify the frequency response through simulation.

Design assignment #3
It is required to design a lowpass filter to meet the following specifications:
   a) $\alpha_p = 0.5 \, \text{dB}$, $\alpha_s = 28\, \text{dB}$, $f_p = 2.4 \, \text{kHz}$ and $f_s = 5 \, \text{kHz}$.
   b) Capacitor values used are in the nano Farad range.
Give the complete design of the filter. Hence, verify the frequency response through simulation.