ECE 512
Filter Design

Instructor: Selim S. Awad
Office: 212 E ELB
Phone: (313) 5935523
E-mail: SAWAD@UMICH.EDU
Webpage: http://www-personal.engin.umich.edu/~sawad/

Office hours: Monday 10-11:30 a.m.
Tuesday: 4:30-5:30 p.m.
and by appointment

Course Overview:
1) Fundamentals of continuous-time (analog) systems
2) Basic types of filters and different realizations (passive and active)
3) Passive and active realizations of simple filters:
   a) First order filters
   b) Second order filters
4) Frequency and impedance scaling (normalizations)
5) Filter transformation:
   a) lowpass to lowpass
   b) lowpass to highpass
   c) lowpass to bandpass
   d) lowpass to bandreject (notch)
6) Filter approximations:
   a- Magnitude response approximations:
      I. Butterworth filters
      II. Chebychev I and Chebychev II filters
      III. Elliptic filters
   b- Phase response approximation (Bessel-Thompson filters):
      I. Lowpass filters
      II. Allpass filters
7) Passive and active realizations of filters
8) An introduction to switching-capacitor filters
9) Sensitivity analysis
10) Frequency limitations of the operational amplifier on filters

Grading system: First test 35%
Second test 35%
Project or term paper 30%
Total 100%
Tests and exams are open book and notes. Honor Code must be strictly observed.
Homework: Solutions to the homework assignments will be available to students.