ECE 260 Exam 3

- for date/time/location information refer to course web site and/or Brightspace site (as appropriate)

- 50 minutes

- closed book

- no calculators

- formula sheet provided as part of exam paper

- material explicitly covered:
    - Chapter 5 (Continuous-Time Fourier Series)
    - MATLAB
      - IMPORTANT NOTE: although MATLAB-related questions are fair game for all exams in course, not all exams will necessarily have such questions

- MATLAB:
    - only basic knowledge required; do not need to know everything in Appendix D (MATLAB)
    - basic syntax, conditionals, loops, user-defined functions

- all comments made for Exam 1 with regard to answering of exam questions still apply; see Exam 1 information for more details

- draft copy of formula sheet will be posted on course web site (prior to exam)

- exam study guide summarizes materials covered in more detail

- exam study guide will be posted on course web site

- preparing for exam:
    - EXTREMELY IMPORTANT: compare assignment answers to posted solutions sets!
    - posted practice exam
    - textbook end of chapter/appendix problems with answer key
    - old assignment problems
    - examples from video lectures
    - skipped textbook examples
    - extra problems from tutorials
    - example problems from optional textbook
    - some extra practice problems can also be found through links listed under the "Extra Practice Problems" heading in the "Miscellany" section of course web site

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Some of the more important things that you should know for the exam include those items listed below. These items have been listed in the approximate order in which they were covered in the course, grouped by chapter/appendix of the lecture notes.

Chapter 5: Continuous-Time Fourier Series

* basic terminology: harmonics, DC component (i.e., 0th harmonic), complex sinusoid, fundamental frequency/period, harmonically-related complex exponentials, etc.
* definition of Fourier series, Fourier series analysis and synthesis equations
* complex exponential form of Fourier series
* how to compute Fourier series coefficients for given signal
* what type of signals can a Fourier series be used to represent (i.e., must be periodic)
* know convergence properties of Fourier series. for example:
  - continuous function of t ... converges uniformly
  - finite energy signal ... converges in mean-squared-error sense
  - Dirichlet conditions satisfied ... converges uniformly except at discontinuities, and at discontinuities converges to average of left and right side of discontinuity
  - know the three Dirichlet conditions
* be familiar with proofs of basic properties of Fourier series (i.e., linearity, time shift, time reversal)
* know relationships between the frequency spectrum of a signal (i.e., Fourier series coefficient sequence c_k) and signal properties: real signal c_k = c_{-k}^*, even real signal c_k = c_{-k} and c_k real, odd real signal c_k = -c_{-k} and c_k imaginary, etc.
* understand what is meant by frequency spectrum, magnitude spectrum, phase spectrum, and be able to find/plot these quantities for a given signal
* understand what is meant by the frequency response of a system (including how to compute the frequency response) and how the frequency response can be used to determine the output for a given input
* know the three basic types of filters (i.e., lowpass, highpass, bandpass) and know what their frequency responses look like

* NOTE: The textbook covers more properties of Fourier series than the ones covered in the lectures. You are only responsible for the ones covered in the lectures.

Appendix D (MATLAB)

* basic language syntax
* arrays (i.e., vectors/matrices), array subscripting
* arithmetic operators (e.g., +, -, *, /, ^, .*, ./, .^)
* relational operators (e.g., ==, ~=, <, <=, >, >=)
* logical operators (e.g., &, |, ~)
* basic looping constructs (e.g., for, while)
* basic conditional constructs (e.g., if-then-else)
* user-defined functions
* know some very basic functions (e.g., size, length, real, imag, abs, angle, plot)