EE 261 **Spring 2025** **Homework 1–Handwritten**

Due Wednesday, Jan. 15, 2024 by 11:59 p.m.

NOTE: This is only the "handwritten" portion of Homework 1. There are also problems you must do online via the Mastering site. For this handwritten portion you must *submit a PDF* scan of your work at Canvas. Please ensure your work is contained in a *single file* and is legible.

The first two problems are end-of-chapter problems from the 12th edition of Nilsson and Riedel. Recall that you have electronic access to the textbook via the Course Materials section of the Canvas course space.

1. Problem 1.28.
2. Problem 1.33.
3. The ZEUS laser at the University of Michigan was (and may still be) the world's most powerful laser. It can generate generate three petawatts of power which is roughly *one thousand times the electrical power consumption of the entire planet!* But, this is a pulsed laser and only generates this power for a very brief time (on the order of a few femtoseconds). Let us assume that for a single pulse the power varies linearly from zero to a peak (of 3 PW) at two femptoseconds (2 fs) and then varies linearly back to zero over the next two femptoseconds.
   (a) How much energy, in joules, is contained in a single pulse of the ZEUS laser?
   (b) Assume the energy found in part (a) is instead used to power a 20 W LED lightbulb. How long with the light be illuminated?

Note: Late homework will not be accepted!