ELEG 667-010 - Advanced Nanostructure Devices – Fall 2006
Homework #9 - due Wednesday, 6 December 2006, in class

1. Problem 7.3, in chapter 7, Lundstrom, p. 312 in 2nd edition. Hint: equate Eq. (7.25) in text, with Eq. (7.36) to eliminate μ_n^o and solve for T_e. Assume T_L = 300K, and show your calculation of β and $\mathcal{E}_{cr}$. Make a table and a plot for $\mathcal{E}$ = $1x10^n$ V/cm up to n = 5, but also 3 and 5x 10^4 V/cm.

2. Problem 7.7a only, in chapter 7, Lundstrom, p. 313 in 2nd edition. Hints: perform the calculation only for 2 points, say $\mathcal{E}$ = 30 and 100 KV/cm. From the plotted v_{drift}, calculate drift energy using m* = 0.26 m_o, and put in eV (divide by q), so that it can conveniently compared with u.

3. Compare the table from Problem 7.9, in chapter 7, Lundstrom, p. 313 in 2nd edition, with your own Monte Carlo simulations from NanoHub. Do they agree, or disagree, and why?

4. Problem 8.4, in chapter 8, Lundstrom, p. 361 in 2nd edition. Hints: do the first integral of potential (or field) over position in terms of z, which is a variable for the second integral to obtain V. Assume that $\mathcal{E}_z(0) = 0$, and that J_{nz} and μ_n are constant.

Homework assignments will appear on the web at:
http://www.ece.udel.edu/~kolodzey/courses/eleg667f06.html
Note: On each homework and report submission, please give your name, the due date, assignment number and the course number. For full credit - include units/dimensions for all numerical quantities