ECE 4300, Fall Semester 2016
Lasers and Optoelectronics

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Assignment 3

Present your solutions *neatly*. Do not turn in rough unreadable worksheets - learn to **take pride in your presentation**. Show the relevant steps, so that partial points can be awarded. BOX your final answers where applicable. Draw figures wherever necessary. **Please print out the question sheet(s) and staple to the top of your homework.** Write your name, email address, and date/time the assignment is turned in on the cover.

Note: Assignment 1 has additional directions on deadlines, and rules for collaborative work.

Posted on: Wednesday, 9/28/2016. Due on: 10/12/2016, Wednesday

Problem 3.1 (Mode-Matching of a Gaussian Beam)
Verdeyen Problem # 5.13.

Problem 3.2 (Optical Cavity Resonator Properties)
Verdeyen Problem # 6.1.

Problem 3.3 (Cavity Resonator with Gain)
Verdeyen Problem # 6.5 - 6.10 (It is just one problem!).

Problem 3.4 (Gain necessary for a Laser)
Verdeyen Problem # 6.19.

Problem 3.5 (Hermite-Gaussian Modes in a Laser Cavity)
Verdeyen Problem # 6.25.

Problem 3.6 (Wien $\rightarrow$ Rayleigh-Jeans $\rightarrow$ Planck's Blackbody Radiation Formula)
Verdeyen Problem # 7.14.

Problem 3.7 (Lineshape)
Verdeyen Problem # 7.4.

Problem 3.8 (Laser Rate Equations)
Verdeyen Problem # 7.10. For part (b), provide a plot of the populations with time.