Physics 3750 Laser Physics Outline (Tenative) **Fall 2007**

Week	Date	Monday	Wednesday	Friday
1	27-Aug	Ch.1 Introduction	2.1 Maxwell's Eqn's 2.2 Wave Eqn	2.3 Interaction of light with matter
2	3-Sep	Labor Day	2.3 cont. 2.4 Coherence	QM review
3	10-Sep	4.1Decay of Excited States	4.1 Cont. 4.2 Line Broadening Due to Radiative Decay	4.3 More Line Broadening
4	17-Sep	Test 1	6.1 Equilibrium 6.2 Radiating Bodies	6.3 Cavity Radiation
5	24-Sep	6.4 Absorption and Stimulated Emission	7.1Absorbtion and Gain	7.2 Population Inversion 7.3 Saturation Intensity
6	1-Oct	7.4 Development and Growth of a Laser Beam	7.5Exponential Gain 7.6 Threshold Requirements for a Laser	8.1 Laser Gain Saturation 8.2 Laser Beam Growth Beyond Saturation
7	8-Oct	8.3 Optimization of Laser Power 8.4 Energy Exchange	8.5 Laser Output Fluctuations	Test 2
8	15-Oct	Fall Break	9.1 Inversions and Two-Level Systems 9.2 Relative Decay Rates	9.3 Steady-State Inversions in Three- and Four-Level Systems
9	22-Oct	9.4 Transient Population Inversions	9.5 Process That Inhibit Inversions	10.1 Excitation or Pumping Threshold Requirements
10	29-Oct	10.2 Pumping Pathways	10.3 Specific Excitation Parameters Associated with Optical Pumping	11.1Intro to Cavity Modes 11.2 Longitudinal Laser Cavity Modes
11	5-Nov	11.2 cont. 11.3 Transverse Cavity Modes	11.4 Properties of Laser Modes	Test 3
12	12-Nov	Veteran's Day	12.1 Stable Curved Mirror Cavities	12.2 Properties of Gaussian Beams
13	19-Nov	13.1 Unstable Resonators 13.2 Q-Switching	13.3 Gain Switching 13.4 Mode-Locking	Thanksgiving
14	26-Nov	16.1 Wave Propagation in Anisotriopic Crystals 16.2 Polarization of Materials due to Light	16.3 Second Order Non-linear Processes	16.4 Third-Order Non-Linear Processes
15	3-Dec	16.5 Non-Linear Materials 16.6 Phase-Matching	Test 4	No Class(Finals begin)

Final Exam: Presentations Tues Dec. 11 2006, 1:30 am - 3:30 pm