ECE/PH 483/583 - GUIDED WAVE OPTICS  
Spring Term 2012

Instructor: Alan X. Wang, Ph.D.  [Office: Kelley Engr. Center, Room 3097; Phone: 737-4247; Email: wang@eecs.oregonstate.edu]  
Office Hours: M,W 3:30-4:30pm  or by appointment (e-mail me to set up a time)

Class TA: Ram Ravichandran <ravichra@engr.orst.edu> 
Office Hours: Arrange by email appointment and TBA

Meeting Times:  
Class: MWF 2-2:50 or MW 2-3:15pm in KEC 1005  
Labs: Tuesday 9-12am; 1-4pm in Dearborn 222  
[For explanation, demos, quizzes. Groups will do labs at their own selected times during the week.]

Course Objectives:  
1. Understand the physics of photonic devices – planar and fiber optical waveguides, semiconductor light sources, amplifiers, detectors, and integrated optical devices  
2. Gain technical skills in handling, measuring and using optical fibers and components  
3. Be able to correctly use LED and diode laser sources and photodetectors  
4. Learn design skills for fiber optical systems and sub-systems  
5. Design, build, and demonstrate an optical waveguide project in the laboratory


Labs:  
Week 1: Safety, photodetectors  
Week 2: Laser beam profiles (HeNe and diode laser pointer) Lab Quiz #1 on week 1 lab  
Week 3: Optical fibers – SM and MM, modes, index profile measurement Lab Quiz #2 on week 2 lab  
Week 4: Sources: LEDs and LDs - coupling, GRIN lenses; Lab Quiz #3 on week 3 lab  
Week 5: Attenuation, dispersion, OTDR, fusion splicing; Lab Quiz #4 on week 4 lab  
Week 6: EDFA fiber amplifier [most difficult lab]; Lab Quiz #5 on week 5 lab  
Week 7: Project proposals and begin work on projects Lab Quiz #6 on week 6 lab  
Weeks 8-10: System Design/Design application projects

Lab Notebook: Students are expected to keep a timely, current working laboratory notebook. It should be bound and entries should be made in ink. Lab notebooks should contain some brief but clear notes on procedures/setups, any useful formulas, derivations, observations made in the lab including sketches or rough plots – [be sure to include what ‘didn’t work as expected], collected data, and brief but clear discussion of the results. You will get to use ONLY your lab notebooks for the 5 lab quizzes.

Lab Reports: Each student will be required to write up a short report answering the assigned questions for the lab experiment and commenting on what didn’t work as expected. This is often where the real learning happens.

Lab Project: The lab project should be done in groups of 2-3 persons. It will include a project proposal, weekly written progress reports, a final written Project Report (1 per team), and demonstration to the instructor and/or lab TA and, hopefully, others in the class also. The purpose of the project is to use the knowledge you have gained about optical waveguides and system components to design, fabricate, and test a working application or simulation.

Grading: Laboratory (25%) [Technique/Lab reports 30%, 5 (of 6) Quizzes 40%, Project 30%]  
Homework/Literature Review (25%); Midterm Exam (20%); Final Exam (30%)

Scheduled Final Exam: Monday of the Final Week, 2-4pm