Physics 201: Waves and Optics

Fall 2011

http://www.ruf.rice.edu/~hafner/phys201.html

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Meets: MWF 9:00 – 9:50 in HZ 210
Texts: *Vibrations and Waves*, French
Introduction to Optics, Pedrotti[3]

Content: This course covers harmonic motion, waves in continua, electromagnetic waves, and physical optics. Emphasis is on physical concepts and mathematical methods that are applicable to many areas of physics.

Obligatory Quotation: *"Dearly beloved, we are gathered here today to get through this thing called life. Electric word life, it means forever and that's a mighty long time. But I'm here to tell you there's something else – the afterworld. A world of never ending happiness. You can always see the sun, day or night. So when you call up that shrink in Beverly Hills, you know the one: Dr. Everything-Will-Be-Alright. Instead of asking him how much of your time is left, ask him how much of your mind baby. Because in this life, things are much harder than in the afterworld. This life, you're on your own. And if the elevator tries to bring you down, go crazy. Punch a higher floor."* – Prince

Homework, Exams, and Grades: There will be one homework problem set per week due at 5:00 pm on Wednesdays. The due dates are all given on the calendar at the class website listed above. Homework should be turned in to the Phys 201 drop box on the second floor of Brockman Hall. Late homework will be penalized 10% per day late unless excused by illness or some other valid reason. Late homework should be turned in to the instructor. The homework problems may be solved in a collaborative manner, but your written solutions must not be directly copied from any source. The exams will be open book, open note, timed take home exams due at 5:00 pm on the dates listed on the calendar. You may not collaborate with other students on the exams. The final grades will be 40% homework and 30% for each of the two exams.

Discussions and Office Hours: A location will be reserved on Tuesdays from 2:00 pm to 5:00 pm for students to discuss the homework problems. The instructor will be in Heaps for discussions during that time, and will hold office hours by appointment.

Topics:

Continua	Electromagnetic Waves	Optics
Simple Harmonic Motion	Vector and Scalar Fields	Plane Wave Interference
Real Oscillators	Maxwell's Equations	Young's Double Slit
Superposition	EM Wave Equation	Thin Film Interference
Damped SHM	EM Plane Waves	Multiple Beam Interference
Driven SHM	Light	Lasers
Coupled SHM	Light in Materials	Fraunhofer Diffraction
Continua	Polarization States	Diffraction from Apertures
Fourier Analysis	Light at a Plane Interface	Multiple Slit Diffraction
Wave Motion	Manipulating Polarization	Image Formation
Dispersion	Huygens and Fresnel Principles	Scattering
Reflection, Transmission, and Absorption		

Students with Disabilities: Any student with a disability requiring accommodations in this course is encouraged to contact me after class or during office hours. Additionally, students will also need to contact Disability Support Services in the Ley Student Center.