Physics 201: Waves and Optics  
Fall 2012  
http://www.ruf.rice.edu/~hafner/phys201.html

Instructor: Jason Hafner  
Office: BRK 262  
Email: hafner@rice.edu  
Call/Text: (713) 588-0422

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

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

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 in 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 are not pledged and may be solved in a collaborative manner, but your written solutions must not be directly copied from any source. The pledged 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 or use sources other than the class material. The final grades will be 40% homework, 30% for the midterm exam, and 30% for the final exam. There is no absence policy.

Discussions and Office Hours: BRK 200 has been reserved on Tuesdays from 2:00 pm to 5:00 pm for students to discuss the homework problems. The instructor will be available for discussions during that time, and will hold office hours by appointment.

Topics:
Continua
Simple Harmonic Motion
Real Oscillators
Superposition
Damped SHM
Driven SHM
Resonance
Coupled SHM
Continua
Fourier Analysis
Wave Motion
Dispersion
Reflection, Transmission, and Absorption

Electromagnetic Waves
Vector and Scalar Fields
Maxwell’s Equations
EM Wave Equation
EM Plane Waves
Light
Light in a Dielectric
Polarization States
Light at a Plane Interface
Manipulating Polarization
Huygens and Fresnel Principles

Optics
Light at a Curved Interface
Plane Wave Interference
Young’s Double Slit
Thin Film Interference
Interferometry
Multiple Beam Interference
Lasers
Fraunhofer Diffraction
Diffraction from Apertures
Multiple Slit Diffraction
Image Formation
Scattering

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.