Physics 300 (PHY300) Waves and Optics

The physics of oscillations and waves, from mechanical waves to light waves to electron waves. Topics include resonance and normal modes of coupled oscillators, the wave equation and wave propagation, interference and diffraction, polarization and imaging, coherence, and lasers. Three lecture hours and one two-hour laboratory per week. This course has an associated fee. Please see www.stonybrook.edu/coursefees for more information.

Prerequisite: PHY 132/PHY 134 or PHY 142/ PHY 134 or PHY 126/PHY 127/PHY 134
Corequisite: MAT 203 or MAT 205 or AMS 261 or MAT 307

4 credits

Professor: Tom Weinacht
Office: Physics Building A102, Phone: 2-8163, Email: thomas.weinacht@stonybrook.edu
TAs:
Julia Codere: julia.codere@stonybrook.edu
James Shirk: james.shirk@stonybrook.edu

Textbooks: Vibrations and Waves by Anthony French, Modern Optics by Grant R. Fowles
Lectures: MW 2:40-4:00, F 2:40-4:30
Grading: HW 20%, Midterm Exam 20%, Worksheets & Lab work 30%, Final Exam 30%

Worksheets are due the Monday of each week in class, and must be initialed by the TAs each day. Homework is due on Friday in class. HW solutions will be posted on the course website on the date the HW is due. No late HW or Worksheets will be accepted.

Week of	Topic	Reading	Worksheet	Homework
January 23	Simple Harmonic Oscillator	French Ch 1, 2	------	-------
January 30	Damping, Driving, Energy	French Ch 3,4	Worksheet #1	-------
February 6	Coupled Oscillators	French Ch 5	Worksheet #2	French 1-1,1-2,1-5,1-6,2-1,2-2,2-3,2-4
February 13	Normal Modes	French Ch 5	Worksheet #3	French 3-1,3-2,3-3,3-13,3-18,4-3,4-5,4-10,4-13
February 20	Strings & Travelling Waves	French Ch 6	Worksheet #4	French 4-16, 5-2, 5-4, 5-9, 5-10
February 27	Fourier Series	French Ch 6,7	Worksheet #5	French 6-1,6-2,6-6,6-11
March 6	Maxwell & Wave Equations	Fowles Ch 1	Worksheet #6	French 6-12,6-14,7-1,7-2,7-3,7-4

March 20	Plane Waves	Fowles Ch 2	Worksheet #7	French 7-5,7-6,7-8,7-9,7-16
March 27	Polarization	Fowles Ch 2	Worksheet #8	Fowles 1.2,1.3,1.5,1.6
April 3			Worksheet #9	Midterm
April 10	Reflection & Refraction	Fowles Ch2	Worksheet #10	Fowles 2.8,2.10,2.12,2.16
April 17	Diffraction	Fowles Ch 5	Worksheet #11	Fowles 5.4,5.9,5.12,5.14
April 24	Interferometers	Fowles Ch 3,4	Worksheet #12	Fowles 3.6,4.1 (see eqns 4.9 and 4.20),4.5,4.7,4.8,
May 1	Ray Optics I	Fowles Ch 10	Worksheet #13	Thanksgiving
May 8	Ray Optics II & Review	Fowles Ch 10	Worksheet #13	Fowles 10.5,10.6,10.7
May 15		-------	Worksheet #14	-------

SPECIAL NEEDS: If you have a physical, psychological, medical or learning disability that may impact your course work, please contact Disability Support Services, ECC (Educational Communications Center) Building, room 128, (631) 632-6748. They will determine with you what accommodations are necessary and appropriate. All information and documentation is confidential. Students requiring emergency evacuation are encouraged to discuss their needs with their professors and Disability Support Services. For procedures and information, go to the following website: http://www.ehs.sunysb.edu/fire/disabilities/asp