

Physics 408
<< Optics >>

Spring 2021

Instructor: Dr. Y. H. Shih

Office: PHYS 310

Telephone: 2558 (o), 1933 (Lab.)

Lectures: Mo We Fr 3:00-3:50pm

Room: Webex Meetings

Text: Eugene Hecht <<Optics>>

References: Born & Wolf <<Optics>>

Robert Guenther << Modern Optics >>

Yanhua Shih <<An Introduction to Quantum Optics>>

Prerequisites: Student should have had a standard undergraduate course in intermediate Electromagnetic Theory and a standard undergraduate course in Mathematical Physics or Engineering Mathematics. In particular, it will be assumed that the students understand the basic theory of ordinary differential equation, basic material about Fourier transform and vector analysis.

Homework: Homework due day will be noticed with the assignment. You are encouraged to discuss the problems together; however, each person should work out their assignment *independently*. Assignments are to be written up professionally with computer graphics where appropriate. The computer worksheets should be readable by anyone. This requires explanations of what you have done.

Grading Method: Homework 20%, Midterm 30%, Final 50%.

Office Hours: W 12:00-3:00pm. I am usually in my Lab. (Rooms 010, 011) and happy to speak with you any time. Call me before your visit.

Topic Outline:

- I. Maxwell's Equations and EM Wave Theory
- II. Einstein's Picture of Light: Quantized EM Wavepacket
- III. Measurement of Light
- IV. Interference and Diffraction
- V. Coherence Theory
- VI. Imaging and Fourier Optics
- VII. Polarization of Light
- VIII. Laser Physics and Nonlinear Optics
- IX. Quantum Optics (Depending on the progress)