

ECE 181: Physical and Fourier Optics
Spring 2009, Section 650879
Prof. Joseph Ford

Course material:

Geometrical optics

Ray optics, simple imaging systems, matrix formalisms

Optical CAD (Computer Aided Design)

Basic guided wave optics

Graded and step index fiber, multimode waveguides

Wave optics

Fresnel and Fraunhofer diffraction

Fourier optics

Spatial frequency decomposition, impulse response & transfer functions

Gaussian beam propagation

Basic holography

Optics in Microscopy

Textbooks

Hecht, *Optics*, 4th Ed., (Addison Wesley, 2002, 0-8053-8566-5)

Lectures

Tuesday/Thursday, 3:30 - 4:50pm, HSS Room 1138

Homeworks:

Assigned Thursdays, due following Thursday in class unless otherwise stated.

Office hours:

Monday 1:00 – 3:00 Room 3405, EBU1

Lab / Demonstrations:

Student Photonics Lab (EBU1, Room B706), TA: Stephen Olivas

- Experiment #1: Imaging properties of a simple lens
- Experiment #2: Introduction to optical ray tracing software.
- Experiment #3: Gaussian beam optics
- Experiment #4: Diffraction
- Experiment #5: Fresnel and Fourier Transforms

Grading:

- 20% Homework
- 20% Labs (participation and 5 shared reports)
- 25% Midterm (5th week during lecture time)
- 35% Final (Monday June 8, 3 - 6 p.m)