

EEL4930/5930

Engineering Optics

Fall 2005

Instructor: Dr. Jim P. Zheng

Room 346

Lecture Hours: MW 3:15-4:30pm

Office Hours: MW 4:30-5:30pm

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Prerequisites: EEL3300, or equivalent (grading C or better)

Corequisites: EEL3472

Textbook: Modern Optical Engineering, The design of Optical Systems, 3rd edition, Warren J. Smith, McGraw Hill, Boston, 2000.

Course Description:

The class introduces senior undergraduate and graduate students to the basic concepts in optical components, optical systems, and their design. It also provides a stepping-stone for students interested in advancing to higher programs in optics. The typical university calculus and physics background is assumed. In addition, some introductory engineering field theory would be helpful. The class begins with a general orientation dealing with electromagnetic waves, Shell's law, interference, diffraction, and the photoelectric effect. It covers optical image formation, aberrations, prisms and mirrors, and aperture stops. The class also introduces human eye, basic optical materials and devices, and radiation concept. At the end, the class requires students to design a particular optical system.

Instructional Objectives:

At the conclusion of this course, students should be able to

1. Understand the general principles of light wave propagation.
2. Analysis geometrical ray path through optical elements including lens, mirrors, and prisms.
3. Discuss basic structure and characteristics of the human eye. Understand the principles of radiometry and photometry.
4. Established optical image based on graphical image construction method.
5. Discuss various aberrations in optical systems.
6. Understand some basic properties of optical materials. These properties include reflection, absorption, and dispersion.
7. Design some basic optical devices such as telescopes, microscopes, endoscopes, and photographic optics.

Grading:	Two Examinations:	50%	(25% from each exam)
	Homework:	10%	
	Final Examination:	40%	(a comprehensive exam)
	Attendance and Quizzes:	5%	(bonus points, no credit will be awarded if one missed more than 3 lectures)

Grading scale: **A: >90%, B: 80-89%, C: 65-79%, D: 50-64%, F: <49%**

These breakpoints may be lowered slightly depending on overall class performance.

Policy Statements:

- Attendance is mandatory.
- Homework is due at the beginning of class.
- The general policy is no makeup exams and quizzes. In the event of an excused absence, you must notify the instructor prior to the exam to discuss proper procedure.
- Cellular phones and beepers must be turned off in the classroom.
- Coming late or leaving early will be considered as the absence of class.
- There is renewed emphasis on the Honor Code. Violation of this code can result in course failure and/or dismissal from the College of Engineering.