

Syllabus: OPT 586L

Polarization in Optical Design Laboratory (1) Practice in computing and interpreting polarization effects in optical systems. Fresnel and thin film equations. Birefringent interfaces. Liquid crystal cells. Polarization ray tracing. Polarization aberration function. Must be taken concurrently with OPT 586.

Schedule Fall 2016 Room 432:

Lab Hours: Monday 11:00 to 12:30 am

Office Hours: Tuesday 1:00 to 2:00 pm, or by appointment

Instructor:

Greg A. Smith, Assistant Research Professor

College of Optical Sciences, Room 707

The University of Arizona

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Units: Lab (1)

Course Outline

- **Mathematica Fundamentals**
- **Polarization Ray Tracing.** Cascading polarization effects through systems. Polarization aberration function.
- **Polarization Effects at Reflecting and Refracting Interfaces.** Fresnel equations. Multilayer film polarization.
- **Polarization Aberrations Examples.** Uncoated lens. Fresnel rhomb.
- **Polarization Models.** Anisotropic materials and interfaces. Birefringent ray tracing. Biaxial multilayer films. Rigorous coupled wave analysis.
- **Realistic Polarization Elements.** Waveplates. Crystal polarizers. Liquid crystal cells.

In class practice in the computation of polarization effects when light propagates through optical systems. Interpretation of the resulting polarization aberrations. Mathematica routines will be used in class by groups of students for simulation of the polarization properties of optical interfaces and optical systems. In-class use of Mathematica is required, but proficiency not expected at the beginning of the semester. Relevant Mathematica code will be distributed or made available over the web. Distance learning students must participate via telephone sessions.

Grading:

- Homework 100%
late penalty of 5%/day or 25%/wk unless permission granted in advance
- No final exam

Software: Each student must have their own copy of Mathematica for use in class.

Academic Integrity

According to the Arizona Code of Academic Integrity

(<http://deanofstudents.arizona.edu/policies-and-codes/code-academic-integrity>),

"Integrity and ethical behavior are expected of every student in all academic work. This Academic Integrity principle stands for honesty in all class work, and ethical conduct in all labs and clinical assignments." Unless otherwise noted by the instructor, work for all assignments in this course must be conducted independently by each student. CO-AUTHORED WORK OF ANY KIND IS UNACCEPTABLE. Misappropriation of exams before or after they are given will be considered academics misconduct.

Misconduct of any kind will be prosecuted and may result in any or all of the following:

- * Reduction of grade
- * Failing grade
- * Referral to the Dean of Students for consideration of additional penalty, i.e. notation on a student's transcript re. academic integrity violation, etc.

Students with Disabilities

It is the University's goal that learning experiences be as accessible as possible. If you anticipate or experience physical or academic barriers based on disability or pregnancy, please let me know immediately so that we can discuss options. You are also welcome to contact Disability Resources (520-621-3268) (<http://drc.arizona.edu/>) to establish reasonable accommodations.

Please be aware that the accessible table and chairs in this room should remain available for students who find that standard classroom seating is not usable.

Syllabus changes

Information contained in this syllabus, other than the grade and absence policies, may be subject to change with reasonable advance notice, as deemed appropriate by the instructor.