Syllabus: OPT 586


Units: Lecture (3), Lab (1)

Instructor: Russell A. Chipman, Professor
College of Optical Sciences, Room 737
The University of Arizona
1630 East University Boulevard, Meinel Building
Tucson, AZ 85721
Phone: 520-626-9435   Fax: 520-626-4599
russell.chipman@optics.arizona.edu
Office Hours: Wed. 2:00 – 3:00 pm and by appointment

Teaching Assistant: Christine Bradley
Meinel Room 717C (cubicles)
Phone: 520-548 8051   Fax: 520-626-4599
cbradley@optics.arizona.edu
Office Hours: Tues. and Thu. 3:00 – 4:00 pm in cubicle

Course Outline

- **Polarization Ray Tracing.** Cascading polarization effects through systems. Polarization aberration function and Jones pupil.
- **Polarization Effects at Reflecting and Refracting Interfaces.** Fresnel equations. Multilayer film polarization.
- **Polarization Aberrations.** Imaging polarimetry of optical systems. Second order polarization aberrations. Polarization point spread function. Polarization optical transfer function. Appearance of polarization aberrations in polariscopes.

Class treats the principals of the calculation of polarization effects when light propagates through optical systems and the interpretation of the resulting polarization aberrations. Use of Mathematica is required. Students are highly encouraged to
register for the associated one unit Polarization in Optical Design Lab. Neither class requires the use of commercial ray tracing software.

**Grading:**
- Homework 40%
- Two tests 30%
- In-class final exam 25%

**Textbook:** Instructors notes, will be handed out throughout the term

**Suggested reference works on polarization (not required)**
- J. Damask, Polarization Optics in Telecommunications, (Springer, 2005)

**Academic Integrity**
According to the Arizona Code of Academic Integrity (http://web.arizona.edu/~studpubs/policies/cacaint.htm), “Integrity is expected of every student in all academic work. The guiding principle of academic integrity is that a student’s submitted work must be the student’s own.” 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 a Learning Disability**
If a student is registered with the Disability Resource Center, he/she must submit appropriate documentation to the instructor if he/she is requesting reasonable accommodations. (http://drc.arizona.edu/instructor/syllabus-statement.shtml).

The 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.
Syllabus: OPT 586L


Schedule Fall 2014 Room 305:
Lab: Monday 9:30 to 10:20 am

Lab Instructor:
Greg A. Smith, Assistant Research Professor
College of Optical Sciences, Room 707
The University of Arizona
1630 East University Boulevard, Meinel Building
Tucson, AZ 85721
Phone: 520-621-8742
gasmith@u.arizona.edu
Office Hours: Mon. 10:30-11:30am, Wed. 8:00 - 9:30 am, or by appointment

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.

In class practice in the computation of polarization effects when light propagates through optical systems. The 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. 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%
* No final exam 0%

Textbook: None