Advanced Lens Design
OPTI 696A

Prof. Jose Sasian

Syllabus
Syllabus OPTI 696A

Instructor:
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Course goals:
• To learn advanced lens design methods.

Schedule:
• TTh TBD

Grade
• Based on HW
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References:
• Class notes in the course Web site
• Introduction to aberrations in optical imaging systems, J Sasian, Cambridge University Press
• Introduction to Lens Design, J Sasian, Cambridge University Press
• http://fp.optics.arizona.edu/sasian/opti696A/

Office hours
• By email appointment
Learning Outcomes

- Explain and design apochromatic objectives
- Explain lens athermalization
- Produce ghost image analysis
- Explain and produce uniform illumination using LEDs and Gaussian beams
- Explain and apply the method of confocal mirror design
- Explain and design lenses without ghost images
- Produce stray light analysis
- Explain aberrations in non-axially symmetric systems
- Explain the irradiance function
- Explain and design zoom lenses
- Desensitize a lens for tolerances
- Explain optical drawings
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Topics

• Design of apochromats and super-achromats
• Lens athermalization; opto-thermal coefficient
• Optical drawings; lens specifications
• Ghost image analysis
• Radiometry of a lens system
• Gaussian to flat-top lenses
• Uniform illumination LED lenses
• Aberrations of non-axially symmetric systems
• Method of confocal mirror design
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Topics

• Designing with off-the-shelf lenses
• Miniature lenses: mobile phone lenses, microscope objectives, endoscope lenses
• Tolerancing and lens de-sensitization
• Zoom lenses
• Mirror systems
• Catadioptric systems
• Lenses for micro-lithography
• Polarization aberrations
• Guest lecturers
Academic Integrity

- **Academic Integrity**
  According to the Arizona Code of Academic Integrity ([http://dos.web.arizona.edu/uapolicies/cai2.html](http://dos.web.arizona.edu/uapolicies/cai2.html)), “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](http://drc.arizona.edu/instructor/syllabus-statement.shtml)).
Face coverings are required in our classroom: Per UArizona’s Administrative Directive, face coverings that cover the nose, mouth, and chin are required to be worn in all learning spaces at the University of Arizona (e.g., in classrooms, laboratories and studios). Any student who violates this directive will be asked to immediately leave the learning space, and will be allowed to return only when they are wearing a face covering. Subsequent episodes of noncompliance will result in a Student Code of Conduct complaint being filed with the Dean of Students Office, which may result in sanctions being applied. The student will not be able to return to the learning space until the matter is resolved.