

Practical Optical Design

OPTI 617

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Guest speakers

Syllabus



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Instructor:

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- On-line
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Course goals:

- To do practical optical system design
- Learn design methods and applications
- An emphasis in applications for optical engineering.

Schedule:

- MW, 3:30 PM-4:45 PM, Zoom meetings
- Six homework design projects

Homework:

- PDF Files: OPTI 617 your name.



Learning outcomes

- Writing a compliance matrix
- Applying optical design methods
- Performing lens optimization
- Explaining optical system applications
- Designing optical systems



Tentative Lectures

	M	T	W	Th	F			M		W	
January	13	14	15	16	17					1	Introduction
	20	21	22	23	24					2	Specificatio and concepts
	27	28	29	30	31			3	Design for manufacturing	4	Light source, detector, ...
Feburary	3	4	5	6	7			5	MicroLithography (Video)	6	Stray light analysis (Video)
	10	11	12	13	14			7	Lens design I	8	Lens design II
	17	18	19	20	21			9	Optical materials and color correction	10	Optomechanical design I
	24	25	26	27	28			11	Optomechanical design II	12	Microscope I
March	2	3	4	5	6			13	Microscope II	14	Microscope III
	9	10	11	12	13						
	16	17	18	19	20			15	Photographic systems I	16	Photographic systems II
	23	24	25	26	27			17	Display I	18	Display II
	30	31	1	2	3			19	Endoscope	20	Confocal
April	6	7	8	9	10			21	Tolerance analysis I	22	Tolerance analysis II
	13	14	15	16	17			23	Telescope	24	Infrared system
	20	21	22	23	24			25	Stray light analysis	26	Freeform optics
	27	28	29	30	1			27	Zoom system	28	Optical coating
	4	5	6	7	8			29	Miscellaneous topics I	30	Miscellaneous topics II



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Practical optical system design

Methods

- Specifications, JS 1L
- Lens design, JS 3L
- Opto-mechanical design, JS 2L
- Materials RL 1L
- Stray Light, MT 3L
- Displays, RL 2L
- Design for manufacturing, JS 1L
- Sources and detectors, RL 2L
- Tolerance analysis, JR 1L
- Coatings, RL 1L
- Freeforms, JS 1L

Other

- Alignment JS 1L
- Off-the-shelf prototyping JS 1L

Systems

- Microscopes, RL 3L
- Telescopes, JS 2L
- Photographic systems, JS 1L
- Endoscopes, JT+AG 3L
- Micro lithography, JS 1L
- Zoom systems, JS 2L
- Infrared systems, RD 2L
- Confocal, RL 1L

HW

- Compliance matrix
- Packaging
- Power efficiency
- Cost
- Lens design/drawings/tolerances
- Opto-mechanical design
- Coatings/transmission
- Simulation
- Light loss
- Reporting



Software

- <https://wp.optics.arizona.edu/helpdesk/osc-site-licensed-software/>
 - Password: OSCstudent
- Optical design software
 - Zemax
 - CodeV
 - LightTools
 - FRED
 - Optilayer
- Opto-mechanical design software
 - Solidworks
- Zemax seminars
 - <https://www.zemax.com/resources/webinars>
 - <https://www.youtube.com/user/RadiantZemaxLLC/videos>

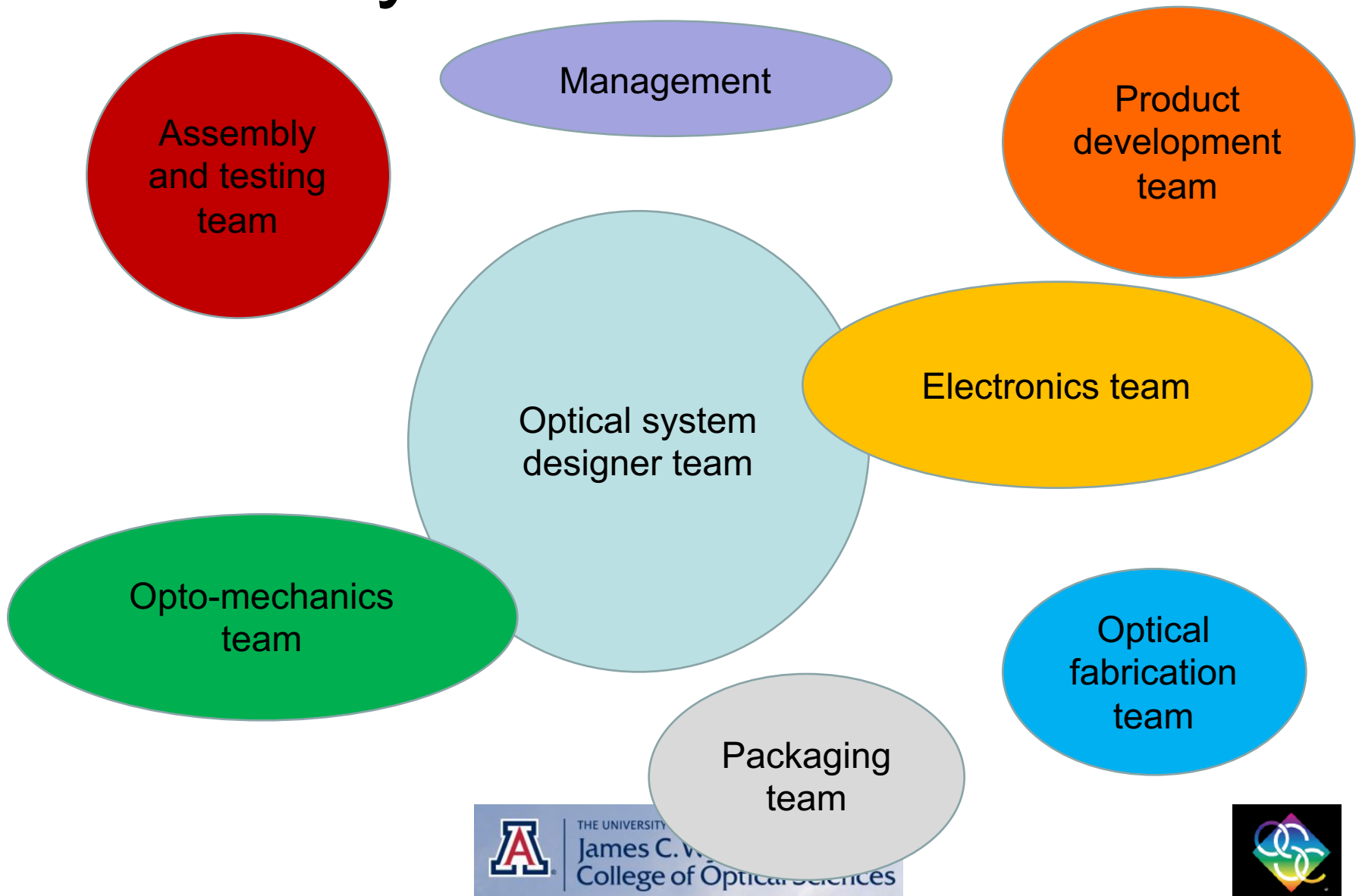


Notes and Textbook

- Course notes: will be posted before the date of the class
- Recommended textbook:
 - Handbook of Optical Systems, Vol. I-IV
 - Optical System Design, Robert Fisher



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Academic Integrity

- **Academic Integrity**
According to the Arizona Code of Academic Integrity (<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>).



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.

