Fall 2024-25: OPTI 340A – Introduction to Optical Design

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RM 432
Wednesdays 12:00 – 12:50 PM

Objectives: This one unit class will introduce students to the optical design software CODE V. At the end of the semester students should be able to maneuver comfortably within the CODE V environment, input multiple optical surfaces, generate performance metric reports, create a merit function and optimize an optical system. The ultimate goal of this class is to have students be able to excel on the first day of OPTI 340 next semester.

Class Website: D2L

Instructor:

Yuzuru Takashima, Ph.D., Professor
ytakashima@optics.arizona.edu
626-6992, Meinel RM 627 or GCRB 244

Office Hours: Tuesdays 1:00-2:00pm, in person or zoom **upon sign up.**
If you plan to attend office hour over zoom, please email me in advance to schedule meeting time.

https://arizona.zoom.us/j/2276146268

Required Software, Text, and Materials:

1) CodeV
https://wp.optics.arizona.edu/helpdesk/osc-site-licensed-software/

Code V software is required for this course. Enrolled students may obtain an electronic key for one license by asking password.

https://wp.optics.arizona.edu/helpdesk/osc-site-licensed-software/other-links/
Password: OSCstudent

Installation: Run the installer. At the "License installation Options" screen select Floating (network) license and use the following hostname: license.optics.arizona.edu

CodeV works on Windows OS or equivalent virtual machine on Mac.
You must be connected to the U of A VPN to use this software offsite.

VPN required when accessing to CodeV of-campus. Windows only.

Recommended References:

Texts: PDF copy available from UA library and on D2L:

- Kidger, Michael. J (2001). Fundamental Optical Design. SPIE monograph. ISBN-10: 0819439150
- James C. Wyant, Basic Wavefront Aberration Theory for Optical Metrology

- Code V Reference manuals, Test Drive and Introductory user's Guide (See handout for instructions on downloading).

Coursework Policies:
Homework:
All problem sets and design projects are to be turned in to D2L by 11:59pm. Late homework will be marked off by 50%. No late turn in is allowed after 1 week of the due date. All homework, exams, design projects, etc., must include your **name, and course number (OPTI 340A) as header, and page number at bottom, 5pt deduction without those info**. Must be done on one side of an 8½ x 11 sheet of paper. Scan and uploaded in a single PDF format. Figures and answers if handwritten has to be readable. Submission with separate pictures, such as jpeg, bmp format will not be graded.

Grading of Exams, Design Projects and HWs:
No re-grading of exams and homeworks after one week from the day the solution is posted (i.e., solution posted on Monday, students need to complete regrading by following Sunday). We consider late turn in of assignments to accommodate students' academic and health needs, such that attending an academic conference and student is sick, provided that students obtained a permission from the instructor **in advance**.

Attendance Policy:
Class will be given in person, broadcasting and pre-recorded formats.
Students are expected to be regular and punctual in class attendance. There is a strong correlation observed between the attendance rate and final grade. Excused absences include: all holidays or special events observed by organized religions for those students who show affiliation with that particular religion and absences approved by the UA Dean of Students and notification of it to the instructor in advance.

Grading Policy: The grading for the class will be based upon homework, and two exams. The distribution of points within each of assignments and exams are determined by the instructor.

Attendance	5%
Homeworks and other assignements:	45%
Midterm	25%
Final	25%

The following grading scale will be used:
100%-90%: A | 75%-89%: B | 65%-74%: C | 55%-64%: D | 0%-54%: E

Preliminary Class Outline

Lecture 1: Class Intro/Obtaining CODE V/Huygens' Fermat's principle in lens design
Lecture 2: Huygens' Fermat's principle in lens design, Ray Aberrations
Lecture 3: Medeling a singlet by CodeV
Lecture 4: Ray and Waveaberrations
Lecture 5: Spherical Aberration (1)
Lecture 6: Spherical Aberration (2)
Lecture 7: Coma (1)
Lecture 8: Coma (2)
Lecture 9: Landscape lens and Astigmatism
Lecture 10: First Half Review
Midterm (Format TBD)

Lecture 11: Field Curvature and Astigmatsim
Lecture 12: Distortion
Lecture 13: Chromatic Aberration 1
Lecture 14: Chromatic Aberraiton 2
Lecture 15: Second Half Review
Final (Format TBD)

Academic Integrity

According to the Arizona Code of Academic Integrity (http://deanofstudents.arizona.edu/aboutdeanofstudents), "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/learn/test-accommodation.html).

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.