

## Fall 2023-24: OPTI 340A – Introduction to Optical Design

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](mailto:ytakashima@optics.arizona.edu)

626-6992, Meinel RM 627

**Office Hours:** Tuesdays 11:30-12:30pm, in person or online upon sign up

**If you plan to attend office hour over zoom, please email me in advance to schedule meeting on time.**

Join URL: <https://arizona.zoom.us/j/84003506339>

**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.

**Recommended References:**

**CodeV Portal:**

<https://opticsportal.synopsys.com/SitePages/Home.aspx>

**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 5:00 pm. 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.** 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.

#### **Reports:**

Reports should be completed and turned in as a formal written report formatted based on SPIE template (<http://spie.org/x5258.xml?SSO=1>). Grammar and formatting including page number, play an important part in your grade. Additionally, one page summary format, on weekly basis, will be used to keep track of progress of the final project. Scan and uploaded in a single PDF format. Submission with separate pictures 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, family and health needs provided that students obtained a permission from the instructor in advance.

**Attendance Policy:** 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 assignments:	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 (Craig Pansion)

**Lecture 4:** Ray and Waveaberrations

**Lecture 5:** Spherical Aberration 1

**Lecture 6:** Spherical Aberration 2

**Lecture 7:** Reflective Optical System and Coma 1  
**Lecture 8:** Reflective Optical System and Coma 2  
**Lecture 9:** Landscape Lens and Astigmatism  
**Lecture 10:** First Half Review  
**Midterm (Format TBD)**

**Lecture 11:** Field Curvature and Astigmatism  
**Lecture 12:** Distortion  
**Lecture 13:** Chromatic Aberration 1  
**Lecture 14:** Chromatic Aberration 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 academic 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.