

**OPTI 340, Optical Design
Spring 2023-2024**

Lecture& Discussion Session:

MWF: 9:00 – 9:50 am

Tu: 9:00(8:00) – 10:15 am

Instructor:

Yuzuru Takashima, Ph.D., Professor

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Office hour TBD, also by appointment

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Teaching Assistant:

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Administrator:

Victoria Picazzo Bautista

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Course objectives:

This course will provide students with a fundamental understanding of third order aberrations as applied to lens design. Emphasis will be on practical understanding of the optical design procedure and the use of an optical design program (CodeV, Synopsys) to correct for the third order aberrations.

The primary objective of this course is to enable an optical engineering student to:

1. Understand nature of optical design: art and science.
2. Develop skill to efficiently use ray trace code.
3. Design optical systems for a particular application based on specifications.
4. Understand classical lens designs, characteristics/limitations.
5. Develop insight to determine the necessary image quality for an application as well as the limitations of designs.
6. Develop the knowledge to evaluate lens designs via various figures of merit, i.e., ray aberrations, spot diagrams, modulation transfer functions, Strehl ratio.
7. Understand importance of Tolerancing in optical design.

D2L: Main Class Web

Required Text and Materials:**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 for a password. Please email helpdesk@optics.arizona.edu for the password to the page:

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

* Remember you must be connected to the **UofA VPN to use this software offsite.**

* CodeV runs only on Windows. Mac users: see [How to install Windows 10 on Mac \(microsoft.com\) for Intel Mac, or use virtual machine environment for newer mac with ARM \(M1-3\) CPU. Technical help is available from the help desk of the college:](#) helpdesk@optics.arizona.edu.

Recommended References:

- Jenkins, Francis and White, Harvey (2001). *Fundamentals of Optics*. McGraw-Hill, ISBN-10: 0072561912
- Kidger, Michael. J (2001). *Fundamental Optical Design*. SPIE monograph. ISBN-10: 0819439150
 - <https://ebookcentral.proquest.com/lib/UAZ/detail.action?docID=728562>
- Smith, Warren (2007). *Modern Optical Engineering* (4th ed.). McGraw-Hill. ISBN-10: 0071476873
 - <https://ebookcentral.proquest.com/lib/uaz/detail.action?docID=4656882>
- James C. Wyant, *Basic Wavefront Aberration Theory for Optical Metrology*
- Code V Reference manuals, Test Drive, and Introductory user’s Guide

Lectures:

Lectures and discussion sessions are dynamically scheduled to accommodate students’ needs.

Attendance Policy:

Students are expected to be regular and punctual in class attendance. When class recording is available, access to the recording is granted for the review purpose to the student who attended the class. Please email the instructor to access the recording if available.

Discussion Sessions:

Discussion Sessions are also dynamically scheduled to accommodate students’ needs. Attendance is required when it is held. In the discussion session, students interact with Instructor(s) and Teaching Assistant to discuss and explore design projects. Also, the time slot will be used for exams, lectures, and project meetings.

Coursework Policies:**Homework:**

All problem sets and design projects are to be turned in to D2L on the date due (by 23:59 pm). Late homework and report will be marked off by 50%. No grading after the solutions is posted.

All homework, exams, design projects, etc., must include your:

Name

Course number (OPTI 340)

Page number at the bottom.

Submission without that information is 5pt deduction of grading. Submission must be done on one side of an 8½ x 11 sheets of paper. Scan and uploaded in a **single PDF format. Files submitted in the file type/format other than the specified one, will not earn grade.** Submission in a form of separated pictures will not be graded.

The policy is strict and not negotiable. Figures and answers, if handwritten, must be readable.

We consider late turn in of assignments to accommodate students' academic (i.e., away from campus to attend academic conference), and health needs only if students obtained **a prior permission** from the instructor. No same day request for extension is granted, unless the situation is serious and critical.

Course Grading:

Grading Policy: The grading for the class will be based upon homework including design works, and exams.

Homework problems including CodeV design works	50%
Midterms #1 and #2 (Late in Feb, and early in April)	25%
Final Exam/Project (Format TBD)	25%
100%-89%: A 80%-88%: B 70%-79%: C 55%-69%: D 0%-54%: E	

The distribution of points within and over each of assignments and exams are determined by the instructor and subject to change. Instructure reserves the right to adjust the grading scale.

Academic Integrity

According to the [Arizona Code of Academic Integrity](#) "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 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 Disabilities

Accessibility and Accommodations: *At the University of Arizona, we strive to make learning experiences as accessible as possible. If you anticipate or experience barriers based on disability or pregnancy, please contact the Disability Resource Center (520-621-3268, <https://drc.arizona.edu>) to establish reasonable accommodations.*

The information contained in this syllabus may be subject to change with reasonable advance notice, as deemed appropriate by the instructor.

The instructor reserves the right to modify the contents in the syllabus. It is the students' responsibility to keep up with the latest policy by regularly attending class and frequently checking the announcements on D2L.