OPTI 471B Syllabus (Spring 2026)
(Revised on 01/14/2026)

Lecture: Friday 1:00PM-1:50PM, In Person

Instructor Information

- Prof. Hong Hua, Rm 741 (west wing)
- Email: hhua@optics.arizona.edu (Preferred method of contact)
- Phone: 520-626-8703
- Office hour (in person or via zoom): Monday 11:00AM-Noon or by appointment.

Zoom Links

- Friday lecture recording: https://arizona.zoom.us/j/88452318051
- Instructor Monday office hour (11:00AM-Noon): https://arizona.zoom.us/j/81471022452
- TA office hours (Tuesday 12-1:00PM): in person in Rm 454 or via zoom: https://arizona.zoom.us/j/87078605166

TA Information

- Kongo Lai: yongxinlai@arizona.edu Cell: 747-334-6448
  - Leading section assignments: Monday afternoon, Tuesday morning
- Stewart Nickel: stewartnickel@arizona.edu Cell: 605-940-4033
  - Leading section assignments: Tuesday morning, Wednesday afternoon

Friday Recitations (1:00-1:50pm, Room 410):

The Friday recitations in classroom 410 will review the related fundamentals and the lab procedures of the week. It is mandatory to attend the recitation sessions.

Lab Schedule (Room 454):

Section 1:	Monday	1:00pm – 4:50pm
Section 2:	Tuesday	8:00am – 11:50am
Section 3:	Wednesday	1:00pm – 4:50pm

Pre-requisites

- Opti 471A, OPTI 340

Course Overview

This course prioritizes hands-on skills and lab techniques along with the optical principles discussed in the junior and senior level optics courses. OPTI471B. Advanced Optics Laboratory (2) II. Gaussian beam optics; Optical element testing; On-axis and Off-axis aberration testing; MTF measurement; Interferometry; Imaging system calibration; Human visual system. Specific topics to cover include:

- Gaussian beam optics:
  - Beam alignment
  - Propagation and profiling
  - Filtering, expanding, imaging, collimation and propagation
- Optical testing:
  - Radius of curvature testing of optical elements with interferometers
  - Measurement of spherical aberration;

    - Measurement of off-axis aberrations;
    - Measurement of the modulation transfer function
    - Aberration testing with interferometers
- Imaging systems
    - Image acquisition, analysis and processing
    - Imaging system calibration
    - Human visual system

Learning Outcomes

Upon completion of this course, students will be able to:

- Apply the optical principles discussed in the junior and senior level optics courses to experimental situations, design and build experimental setups, and observe laboratory phenomena. Examples include but not limited to:
    - Design and build Gaussian beam imaging and expansion systems with parts readily available in the laboratory;
    - Characterize the physical properties of a Gaussian beam;
    - Build test setups to: (1) measure on-axis and off-axis aberrations of lenses; (2) observe diffraction phenomena in the laboratory; and (3) measure modulation transfer functions and distortion of an imaging system;
    - Build interferometric systems to test optical aberrations of lenses or mirrors.
- Effectively assemble and align various optical systems in the laboratory;
    - This lab requires students to assemble their labs themselves to gain hands-on experiences.
- Clearly and accurately summarize and communicate experimental procedures and results through both written reports and video presentations.
- Collaborate as a team with rotating roles (Due to pandemic, there is no more team activities).

Text & Readings

- No text required
- Selected readings will be assigned. They will be available for downloading through the course website.
- Instructor's lecture notes and lab instructions will be available for downloading through the course website.

Grading

The final grade will be based on pre-lab assignments, video presentations, quiz, final lab report, and attendance. The finale grades are not curved, but assigned by: 100% – 90% = A, 89% – 80% = B, 79% – 70% = C, 69% – 60% = D, Below 60% = E. Points are rounded to the nearest whole %.

• Pre-lab assignments (9 assignments):	18%
• Weekly video presentation (11 video reports):	44%
• Term Exam/Quizzes:	30%
• Final Lab Report (1 written report):	5%
• Mandatory attendance	3%
Total	**100%**

Late Submission Policy

- No late submission is accepted for all lab assignments.

Attendance Policy

- Please stay at home if you feel sick or have any of the symptoms of COVID-19.
- Students who need to miss a class, or series of classes, due to illness or the need to quarantine/isolate are responsible for emailing the course instructor, with copy to the Dean of Students, to let them know of the need, as soon as possible.
- Students are responsible for completing any work that they might miss due to illness, including lecture and lab attendance, assignments, tests and exams.
    - Students who miss a lecture or a series of lectures, are required to watch the recorded ZOOM lectures and provide the instructor confirmation or feedback.
    - Students who miss a lab or a series of labs, are required to perform make-up labs during the make-up weeks or other time approved by the instructor or teaching assistants.
- Non-attendance for any reason does not guarantee an automatic extension of due date or rescheduling of examinations.
- Students are responsible for communicating with their instructor via the means of communication established by the instructor, e.g., via D2L, email, etc.

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.

Week-by-Week Lab and Lecture Schedules

Schedule	Lab #	Lab Topics & Lecture Notes	Lecture Schedule (Friday
Week 1	Introduction	Course introduction	01/16 Intro
Week 2	No lab	No Lab	01/23, Lecture 1
Week 3	Lab1	Kinematic design and Gaussian beam alignment	01/30, Lecture 2
Week 4	Lab2	Gaussian beam profiling and propagation	02/06, Lecture 3
Week 5	Lab3	Gaussian beam imaging and filtering	02/13, Lecture 4
Week 6	Lab4	Optical testing with shear plate interferometer Examples	02/20, Lecture 5
Week 7	Lab5	Measurement of Spherical Aberration	02/27, Lecture 6
Week 8	Lab6	Measurement of off-axis aberrations	03/06, Lecture 7
Week 9		Spring Break	No lecture
Week 10	Lab7	Measurement of MTF Matlab program Matlab data example	03/20, Lecture 8
Week 11	Lab8	Testing optics with shear plate interferometers Wyant's notes on interferogram analysis	03/27, Lecture 9
Week 12	Lab8/9	Simulated interferometry labs with Zemax, Testing optics with Shack Cube interferometer	04/03, No lecture
Week 13	Lab 8/9	Simulated interferometry labs with Zemax, Testing optics with Shack Cube interferometer	04/10, Lecture 10
Week 14	Lab10	Imaging system calibration	04/17, Lecture 11
Week 15	Lab11	Human visual system	04/24, Review Lecture
Week 16	Make up	Make-up week (Labs 7 through 11) and Quiz	05/01, Quiz
Week 17			05/08, Final Report due
Week 18	Final Week		