



SYLLABUS

OPTI 421L/521L: Introductory Optomechanical Engineering Laboratory

**M 12:00-12:50 PM, Meinel 422
Designated Lab Times, Meinel 436 and/or Meinel 101**

Description of Course

The focus of this course is to provide a practical experience to complement the lecture material in the Introductory Optomechanical Engineering course (OPTI 421/521). This course contains one 50 minute class and one 3 hour laboratory session per week. This course contains a series of laboratory modules, ranging from DIY kits to using *black box* instruments to gather data. The goal of this course is to understand the range optomechanical techniques available to engineers and under which circumstances a particular methodology is best applied. In addition to demonstrating activities in the lab, students will be required to prepare technical reports based on their observations and data collected.

Course Prerequisites or Co-requisites

OPTI 421L: must be taken concurrently with or have previously passed OPTI 421.
OPTI 521L: must be taken concurrently with or have previously passed OPTI 521.

Instructor and Contact Information

Instructor:

Jonathan D. Ellis, PhD
Meinel 733
jdellis@optics.arizona.edu

Associate Professor of Optical Sciences
520-621-4929

Office Hours: I will be having office hours three times per week at the following times. During those times, I will set up a Zoom Video Conference line for screen sharing and video chat with students enrolled via distance learning. For Distance Learning students, if you are not able to make the those times, please contact me and I will set up a time that it outside of work hours.

MWF: 1 PM – 2:30 PM Mountain Standard Time (733 Meinel Building)

Zoom Video Conference: Join URL: <https://arizona.zoom.us/j/5852871136>

Teaching Assistant:

Eric Reichel

ereichel16@email.arizona.edu

Lab Hours: TBD

Course Website: [D2L](#)

Course Format & Teaching Methods

This course is primarily a laboratory course, paired with a lecture course to cover the fundamentals. In addition to designated lab sessions, this course has a 50 minute, weekly seminar to discuss activities related to the laboratory sessions and to cover topics related to disseminating technical information.

Course Communications

Students are required to check D2L and their formal University of Arizona email address regarding announcements for the class **once per day**. This is the easiest and most effective communication

for the instructors and teaching assistants to reach the whole class.

Instructor Email Policy: You should only use email as a tool to schedule a meeting with me if office hours conflict with your schedule or to ask a short question that requires a <2 sentence answer. Use the subject line "OPTI: Meeting Request" so that I may auto-sort your emails. Your message should include at least two times when you would like to meet and a brief (one-two sentence) description of the reason for the meeting. Emails sent for any other reason should be done so with caution. Emails that would take 20 minutes to type an answer rather than having a 2 minute conversation are strongly discouraged. I strongly encourage you to ask questions about the syllabus, labs, and assignments during class and lab time. For more in-depth discussions (such as guidance on assignments) please plan to meet in person or call my office. Our conversations should take place in person or over the phone rather than via email, thus allowing us to get to know each other better and fostering a more collegial learning atmosphere. [Adapted from [Duvall, Salem College](#)]

Required Texts or Readings

Required Readings:

Fundamentals of Optomechanics, Vukobratovich & Yoder [\[link\]](#);
Opto-Mechanical Systems Design, Yoder & Vukobratovich (two volume set) [\[link\]](#)
Field Guide to Optomechanical Design & Analysis, Schwertz & Burge [\[link\]](#)

Recommended Readings:

Optics, Hecht [\[link\]](#)
Shigley's Mechanical Engineering Design, Budynas & Nisbett [\[link\]](#)

Required or Special Materials

Students are asked to bring a laptop and/or USB drive to the laboratory sessions for recording and transmitting data. Typically only one student per group needs a laptop for recording purposes.

Assignments and Examinations: Schedule/Due Dates

Undergraduate students will work in teams of two for all lab assignments and reports. The grading will have the following scheme:

Participation: 15%
Laboratory Notebook: 25%
Module 1 Report: 10%
Module 2 Report: 10%
Module 3 Report: 10%
Module 4 Report: 15%
Module 5 Report: 15%

Each of the four lab reports will be graded with the following rubric: 75% for technical content, 15% for technical writing, and 10% for presentation.

No late assignments will be accepted!

Graduate students will work in teams of two for all lab assignments and reports. The grading will have the following scheme:

Participation: 10%
Laboratory Notebook: 10%
Module 1 Report: 10%
Module 2 Report: 10%
Module 3 Report: 20%
Module 4 Report: 20%
Module 5 Report: 20%

Each of the four lab reports will be graded with the following rubric: 75% for technical content, 15% for technical writing, and 10% for presentation.

No late assignments will be accepted!

Final Examination or Project

In lieu of having a final exam, students will submit their laboratory notebooks at the end of the semester when they submit their last Lab Report. These will be returned once graded.

Grading Scale and Policies

The grading system for this course will result in grades ranging from A (excellent) through E (failure).

This course is a 400/500 split level course. In addition to the weighting different between the assignments, graduate students will have additional material to include in the lab reports as noted in the lab manuals. Additionally, the rigorousness and expectations for the technical writing and presentation of the reports will be judged to a higher standard, as one would expect of graduate students who must publish as part of their graduate studies.

Requests for incomplete (I) or withdrawal (W) must be made in accordance with University policies, which are available at <http://catalog.arizona.edu/policy/grades-and-grading-system#incomplete> and <http://catalog.arizona.edu/policy/grades-and-grading-system#Withdrawal> respectively.

Scheduled Topics/Activities

The course is separated into four different laboratory modules, each culminating with a formal report to be submitted. Details on the reports are in the manuals for the modules. The laboratory module schedule is on the master course schedule, located on D2L. Reports are due one week after the end of a particular module. The expectation is that each module should take two weeks to accomplish with the final week to account for delays and other issues that may arise.

Do not leave the report writing to the last week! You should be writing and analyzing data as you go. Once a module is closed, it will not be re-opened, meaning you will lose access to those laboratory resources for collecting and analyzing data. If you leave the writing to the last week, you run the risk of collecting insufficient data, meaning your report will be incomplete. In short, be proactive.

Expected Learning Outcomes

- ▶ **High:** Are able to effectively use optical components, optical and electronic instruments, and computers to perform experiments and do testing in an optics laboratory

For more information regarding Expected Learning Outcomes and ABET Accreditation, please see more resources on the Wyant College of Optical Sciences [Accreditation Website](#).

Accessibility and Accommodations

At the University of Arizona, we strive to make learning experiences as accessible as possible. If you anticipate or experience physical or academic barriers based on disability or pregnancy, you are welcome to let me know so that we can discuss options. You are also encouraged to contact Disability Resources (520-621-3268) to explore reasonable accommodation.

Please be aware that the accessible table and chairs in this room should remain available for students who find that standard classroom seating is not usable.

Code of Academic Integrity

Students are encouraged to share intellectual views and discuss freely the principles and applications of course materials. However, graded work/exercises must be the product of independent effort unless otherwise instructed. Students are expected to adhere to the UA Code of Academic Integrity as described in the UA General Catalog. See:

<http://deanofstudents.arizona.edu/academic-integrity/students/academic-integrity>.

Selling class notes and/or other course materials to other students or to a third party for resale is not permitted under any circumstances. Violations to this and other course rules are subject to the Code of Academic Integrity and may result in course sanctions. Additionally, students who use D2L or UA e-mail to sell or buy these copyrighted materials are subject to Code of Conduct Violations

for misuse of student e-mail addresses. This conduct may also constitute copyright infringement.

Also, students using images from the internet without citation is considered an act of plagiarism. If you have any questions regarding this, please see the instructor. The University Libraries have some excellent tips for avoiding plagiarism, available at <http://new.library.arizona.edu/research/citing/plagiarism>.

Lecture Lateness Policy

The lecture part of this course has a zero-tolerance lateness policy! Students are not required to come to class. However, late students pose a disruption to the lecturer and their fellow students. Once class has begun, no students may be admitted unless they have prior permission from the instructor (namely, those with a course conflict with Lens Design).

Absence & Class Participation Policy

Participating in the course and attending lectures and other course events are vital to the learning process. As such, attendance is required at all lectures and laboratory sessions. Students who miss class due to illness or emergency are required to bring documentation from their health-care provider or other relevant, professional third parties. Failure to submit third-party documentation will result in unexcused absences.

The UA's policy concerning Class Attendance, Participation, and Administrative Drops is available at: <http://catalog.arizona.edu/policy/class-attendance-participation-and-administrative-drop>

The UA policy regarding absences for any sincerely held religious belief, observance or practice will be accommodated where reasonable, <http://policy.arizona.edu/human-resources/religious-accommodation-policy>.

Absences pre-approved by the UA Dean of Students (or Dean Designee) will be honored. See: <https://deanofstudents.arizona.edu/absences>

Threatening Behavior Policy

The UA Threatening Behavior by Students Policy prohibits threats of physical harm to any member of the University community, including to oneself. See <http://policy.arizona.edu/education-and-student-affairs/threatening-behavior-students>.

UA Nondiscrimination and Anti-Harassment Policy

The University is committed to creating and maintaining an environment free of discrimination; see <http://policy.arizona.edu/human-resources/nondiscrimination-and-anti-harassment-policy>

Our classroom is a place where everyone is encouraged to express well-formed opinions and their reasons for those opinions. We also want to create a tolerant and open environment where such opinions can be expressed without resorting to bullying or discrimination of others.

Classroom Behavior Policy

To foster a positive learning environment, students and instructors have a shared responsibility. We want a safe, welcoming, and inclusive environment where all of us feel comfortable with each other and where we can challenge ourselves to succeed. To that end, our focus is on the tasks at hand and not on extraneous activities (e.g., texting, chatting, reading a newspaper, making phone calls, web surfing, etc.).

Additional Resources for Students

UA Academic policies and procedures are available at <http://catalog.arizona.edu/policies>

Student Assistance and Advocacy information is available at <http://deanofstudents.arizona.edu/student-assistance/students/student-assistance>

Confidentiality of Student Records

<http://www.registrar.arizona.edu/personal-information/family-educational-rights-and-privacy-act-1974-ferpa?topic=ferpa>

Subject to Change Statement

Information contained in the course syllabus, other than the grade and absence policy, may be subject to change with advance notice, as deemed appropriate by the instructor.