Syllabus
Advanced Optics Laboratory (Senior Lab)
Optical Sciences: OPTI 471A
Fall Semester, 2022

Professor:
Professor Khanh Kieu, Wyant College of Optical Sciences, Room 626
520-647-4492; kkieu@optics.arizona.edu

Lectures: Mondays, 10:00 - 10:50 in person, Rm 410

Laboratory: Meinel 454. Labs start the 2nd week of class.

Laboratory Sections

Section	Day	Time	TA
A (6)	M	1:30 – 5:20 pm	Madeline Bergay
B (6)	M	6:00 – 9:50 pm	Maxim Lunin
C (3)	T	8:00 – 11:50 am	Madeline Bergay
D (6)	W	1:30 – 5:20 pm	Madeline Bergay
E (5)	W	6:00 – 9:50 pm	Maxim Lunin
F (6)	R	8:00 – 11:50 am	Maxim Lunin

Class Web Site: D2L

Prof. Kieu's Office Hours:
Mondays, immediately after class (Meinel 410→ Meinel 626)

Teaching Assistants:
Madeline Bergay: mbergay@arizona.edu
Maxim Lunin: mlunin@arizona.edu

Textbook: No textbook. Handouts will be provided and background/reference readings are posted on the class D2L site.

Lab handouts: Each lab has a handout describing the laboratory procedures, prelab, and postlab questions. Lab instruction handouts may be revised during the term so check for current versions.

Lab notebooks: Students are highly recommended to keep detailed lab notebooks for recording procedures, data, and analysis. Lab notebooks will not be collected or graded.

Exams: There will be a midterm exam and a final exam. The exams emphasize conceptual understanding of fundamental material from lectures, and also cover some specific procedures / results from the labs.

Filmed video abstracts

For 3 of the 11 labs, each group should record a 4-minute video abstract. At the end of your lab session the TA can assist you in filming your group's lab summary. Within the four minutes everyone in the group must speak at least once. All filming must be done during the lab session, and the videos (or a link) uploaded to D2L within 24 hours of the end of lab. Each video summary should cover all of the following points:

1. Briefly explain the fundamentals behind the one or two key concepts that are being explored in the lab
2. Why are these fundamental concepts worth learning about?
3. What were the one or two most significant results?
4. How do these results compare with your prior knowledge? (Prior knowledge can come from intuition, other classwork, theory, information from lecture, etc.)
5. Explain what you liked & did not like about the lab

Grading:

- Pre-lab and post-lab questions – 35%
- Video summaries – 5%
- Laboratory report (first draft) – 5%
- Laboratory report (final draft) – 20%
- Midterm exam – 10%
- Final exam – 25%

Prelab and postlab questions

- You must show work to get full credit.
- All material is to be turned in online using D2L → Assignments.
- Prelab questions must be completed **before** you start that week's lab. (**Exception**: if you are in a Monday lab section **and** the material for your lab that week was just covered in the lecture earlier that day, then you may turn in your prelab before 5pm on Tuesday.)
- Post lab questions are due at the following week's lecture.
- Questions are graded on a scale of 0-10 points. Three points per problem will be deducted for late homework. The labs have different numbers of questions so some labs may contribute more significantly than others to your final grade.
- Homework solutions will be discussed in lecture upon request but will not be posted to D2L.

Written lab report: Each student will be required to select one lab during the semester on which to submit a polished lab report that includes descriptions of the procedures, data and analysis (including error analysis) as well as references to relevant literature. This report emphasizes quality of content and presentation over quantity of data. The format will be that of an Optics Letters journal paper, but limited to 3 pages. The first draft of the report is due Wednesday, November 23th. Feedback will be provided by Wednesday, November 30th. The final draft is due Wednesday, December 7th. More details will be provided in lecture.

Lab makeup policy: If you are sick, let your TA and the Professor know via email and do not come to lab. The lab with the greatest number of lost prelab & postlab points will not be counted toward your final grade. Other missed labs will receive pre-lab, post-lab and video summary grades of zero. If you must miss more than one lab, you should contact the Dean of Students Office DOS-deanofstudents@email.arizona.edu to share documentation about the challenges you are facing.

Smartphones and laptops
Smartphones must be put away during lectures. Laptops may be used for taking notes, but otherwise should be away as well. During laboratories, necessary phone conversations should take place in the hall outside the laboratory. Laptop use in the laboratories is encouraged to assist in the generation of data plots and analysis.

Course Objectives:
1. Apply the optical principles discussed in the junior and senior level optics courses to experimental situations.
2. Clearly and accurately summarize and communicate experimental procedures and results.
3. Demonstrate knowledge and understanding of error analysis and curve fitting.
4. Learn common optical methods and procedures that are routinely used in the optics and photonics industry.
5. Understand safe and proper handling of common optical equipment.
6. Work in teams to solve problems.

Lab Setup and Topics
Eleven labs related to optical test and measurement are scheduled. Two labs are set up and available for two weeks at a time. Each section is divided into the A groups, which do one of the labs in the first week, while the B groups do the other lab. In the following week, the two groups switch places to do the other lab that they didn't do during the first week. Please refer to the attached calendar for the schedule (which may be subject to change). The labs are:

1. Radiometry
2. Monochromators and Spectrophotometers
3. Acousto-optic Modulators and Deflectors
4. Mueller Matrix Polarimetry
5. The Sagnac Interferometer
6. Faraday Rotation and Stress Optic Coefficient
7. Luminescence
8. Fiber Optic Coupling, Fiber Splicing and Optical Circulators
9. Mode-Locked Fiber Laser
10. Microscopy
11. Schlieren Imaging and Optical Element Testing

Face coverings are recommended in our classroom & laboratory (UArizona's policy may change through the semester): Per UArizona's Administrative Directive, face coverings that cover the nose, mouth, and chin are recommended to be worn in all learning spaces at the University of Arizona (e.g., in classrooms, laboratories and studios). Subsequent

episodes of noncompliance will result in a Student Code of Conduct complaint being filed with the Dean of Students Office, which may result in sanctions being applied. The student will not be able to return to the learning space until the matter is resolved.

Academic Integrity (http://web.arizona.edu/~studpubs/policies/cacaint.htm)
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 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/instructor/syllabus-statement.shtml).

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.