

Physics 302: Introduction to Photonics-Fall 2023

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Class times: MW 12:30-1:45 pm
Office hours: M 3:00-4:30 pm
Office: PAIS 2234

Course Description

Introduction to Photonics is an undergraduate level class focusing on the physical science of light. We also discuss the generation, detection, and manipulation of light and its use as an important tool in the sciences.

The course is organized into four larger topics: electromagnetic radiation, geometric optics, wave optics, and modern optics.

Prerequisites and Co-requisites

Students should have taken PHYS2310. Knowledge of calculus and differential equations is also required.

Textbook

Required: *Introduction to Optics*, 5th edition by Eugene Hecht
Hecht's textbook is a widely used reference for undergraduate level optics courses. Homework problems will often come from this textbook. Students are expected to read relevant sections in the textbook in addition to attending lectures and completing homework.

Other good references:

Introduction to Optics by Pedrotti x3: This textbook is also a good reference. It is close to the same level as Hecht, with a slightly stronger emphasis on mathematical description.

Introduction to Electrodynamics by D. Griffiths: Griffith's text is a great reference for Maxwell's equations and the fundamentals of electromagnetic radiation.

Coursework

Homework (HW):

Homework is due on Wednesdays at 12:30 pm (before class).

Homework assignments will be posted on the class website at least one week in advance: <https://physics.unm.edu/Courses/Drake/Phys302Fa23/index.htm>

Late homework will be accepted for up to a week after the due date (when solutions will be posted). Late homework will drop by 10 points (of 100) for every day late. The lowest homework score will be dropped.

Exams:

There will be two midterm exams (MT1 and MT2) and a final exam (FE).

Bring a calculator to the tests. Cell phones and cell phone calculators are not permitted. All tests are closed book, but students may prepare and bring a single sheet of equations and information.

Midterm and final exam dates are (tentatively):

Midterm 1: October 4, during class

Midterm 2: November 8, during class

Final exam: December 15, 10am-12pm

These dates are subject to change. If you have a known conflict with exam times, please let me know by email ASAP.

In-class Quizzes:

In roughly half of the classes, students will take short (5 minute) open-note quizzes. These quizzes are to test understanding and guide both the students and instructor as to the comprehension of important concepts. Quiz material should be straightforward if one is up to date with the homework assignments and attending lectures. Effort is counted!

The lowest quiz grade will be dropped.

Grading

20% Homework

15% Quizzes

40% Midterm Exams

25% Final Exam

Extra credit opportunities will be available throughout the semester, both by announcement and by reasonable request.

Grading Scale (subject to adjustment)

Points	Grade
90-100	A
80-89	B
70-79	C
60-69	D
0-59	F

Attendance and Illness

Class attendance is expected. However, students who are ill are requested to absent themselves for their own health and their classmates'.

If you cannot attend class, please send an email to the instructor BEFORE class begins. You are responsible for learning the material covered on the day you missed.

Course schedule

For a detailed schedule, see our class website:

<https://physics.unm.edu/Courses/Drake/Phys302Fa23/index.htm>

There will be no class on Monday, September 4 (Labor Day) or Wednesday, November 22 (day before Thanksgiving).

Office hours and support

I will be available on Mondays after class from 3-4:30. I will be available in my office in PAIS (PAIS 2234) or on Zoom by request. I highly encourage your attendance!

How to contact me

Please email me using drakete@unm.edu. I will make every effort to return your email within 48 hours. If you have emailed me and have not yet gotten a response, please resend the email. Sometimes they get lost!

UNM Campus-wide information

COVID-19 Health and Awareness. UNM is a mask friendly, but not a mask required, community. If you are experiencing COVID-19 symptoms, please do not come to class. If you do need to stay home, please communicate with me at drakete@unm.edu; I can work with you to provide alternatives for course participation and completion. Let me, an advisor, or another UNM staff member know that you need support so that we can connect you to the right resources. Please be aware that UNM will publish information on websites and email about any changes to our public health status and community response.

Support: Student Health and Counseling (SHAC) at (505) 277-3136. If you are having active respiratory symptoms (e.g., fever, cough, sore throat, etc.) AND need testing for COVID-19; OR If you recently tested positive and may need oral treatment, call SHAC. LoboRESPECT Advocacy Center (505) 277-2911 can offer help with contacting faculty and managing challenges that impact your UNM experience.

Learning Accommodations: UNM is committed to providing equitable access to learning opportunities for students with documented disabilities. As your instructor, it is my objective to facilitate an inclusive classroom setting, in which students have full access and opportunity to participate. To engage in a confidential conversation about the process for requesting reasonable accommodations for this class and/or program, please contact Accessibility Resource Center at arcsrvs@unm.edu or by phone at 505-277-3506.

Title IX: To meet obligations under Title IX, UNM faculty, Teaching Assistants, and Graduate Assistants are considered “responsible employees.” This designation requires that any report of gender discrimination, which includes sexual harassment, sexual misconduct and sexual violence, made to a faculty member, TA, or GA must be reported to the Title IX Coordinator at the Office Compliance, Ethics and Equal Opportunity (ceeo.unm.edu). For more information on the campus policy regarding sexual misconduct and reporting, see: <https://policy.unm.edu/university-policies/2000/2740.html>.

Confidential Support: LoboRESPECT Advocacy Center, the Women’s Resource Center, and the LGBTQ Resource Center all offer confidential services.

Citizenship and/or Immigration Status: All students are welcome in this class regardless of citizenship, residency, or immigration status. Your professor will respect your privacy if you choose to disclose your status. As for all students in the class, family emergency-related absences are normally excused with reasonable notice to the professor, as noted in the attendance guidelines above. UNM as an institution has made a core commitment to the success of all our students, including members of our

undocumented community. The Administration's welcome is found on our website: <http://undocumented.unm.edu/>.

Respectful and Responsible Learning: We all have shared responsibility for ensuring that learning occurs safely, honestly, and equitably. Submitting material as your own work that has been generated on a website, in a publication, by an artificial intelligence algorithm, by another person, or by breaking the rules of an assignment constitutes academic dishonesty. It is a student code of conduct violation that can lead to a disciplinary procedure. Please ask me for help in finding the resources you need to be successful in this course. I can help you use study resources responsibly and effectively. Off-campus paper writing services, problem-checkers and services, websites, and AIs can produce incorrect or misleading results. Learning the course material depends on completing and submitting your own work. UNM preserves and protects the integrity of the academic community through multiple policies including policies on student grievances (Faculty Handbook D175 and D176), academic dishonesty (FH D100), and respectful campus (FH CO9). These are in the Student Pathfinder (<https://pathfinder.unm.edu>) and the Faculty Handbook (<https://handbook.unm.edu>).

Support: Many students have found that time management workshops or work with peer tutors can help them meet their goals. These and other resources are available through Student Learning Support at the Center for Teaching and Learning.

Connecting to Campus and Finding Support: UNM has many resources and centers to help you thrive, including opportunities to get involved, mental health resources, academic support such as tutoring, resource centers for people like you, free food at Lobo Food Pantry, and jobs on campus. Your advisor, staff at the resource centers and Dean of Students, and I can help you find the right opportunities for you.

UNM Land Acknowledgement: Founded in 1889, the University of New Mexico sits on the traditional homelands of the Pueblo of Sandia. The original peoples of New Mexico Pueblo, Navajo, and Apache since time immemorial, have deep connections to the land and have made significant contributions to the broader community statewide. We honor the land itself and those who remain stewards of this land throughout the generations and also acknowledge our committed relationship to Indigenous peoples. We gratefully recognize our history.