

Physics 464 (ECE 464), Laser Physics I
Mondays and Wednesdays, 13:00 to 14:15 pm, ***PAIS Room 1160***
Fall 2023

Instructor

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Teaching Assistant

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Reference material

Lectures summary, homework assignments will be posted on dielslab.unm.edu.
Possibly the only reference book written by an experimentalist – I would call it the ***Laser Holy Book*** – is:
LASERS, by Anthony E. Siegman, University Press.

Other references:

- Laser electronics, J.Y Verdeyen, Prentice Hall
- Solid state laser engineering, W. Koechner, Springer verlag
- Photonics, Saleh

Assignments

Homework problems will be assigned on a regular base, due generally on Wednesdays. They will count for 40% of the final grade.

Some problems will be treated in class.

Exams One midterm and one final; 30% of grade each.

Syllabus

- Introduction (Definitions, oscillators and amplifiers, typical properties, approaches to laser physics, coherence).
- Review of E&M.
- The amplifying medium.
 1. 2-level systems.
 2. Rate equations approximation.
 3. Einstein coefficients.
 4. Saturation.
 5. 3 level rate equations, optical pumping.
- Saturation and broadening mechanism.
- Optical cavities, ABCD matrices.
- Gaussian beams.
- Wave mixing.
- Time-space analogy.
- Q-switching, Mode-locking.
- Miscellaneous lasers

Grading

Homework 40%, Test1 30%, Test2 30%.

Questions, Communication

Please call me at 272 7830 or 277 4026 to make appointment. Please leave a message.

One person only: we can meet either in my office in Physics (PAIS 2236) or at CHTM (114A).

Small groups (2 or more): I can reserve a meeting room (classroom) at CHTM.

Remote

For those not able to attend in person: Zoom ID: 276 326 3855

Password lasers464

(definitely uncrackable by UNM IT)

Accessibility

In accordance with University Policy 2310 and the Americans with Disabilities Act (ADA), academic accommodations may be made for any student who notifies the instructor of the need for an accommodation. It is imperative that you take the initiative to bring such needs to the instructor's attention, as he is not legally permitted to inquire. Students who may require assistance in emergency evacuations should contact the instructor as to the most appropriate procedures to follow. Contact Accessibility Resource Center at 277-3506 for additional information.

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Academic Integrity

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