

# Physics 319: Optics

Dr. Anuradha Gupta

Spring 2024

Class Hours: TTh 1:00 - 2:15 pm

Lab Hours: two hours per week to be scheduled

Office Hour: By appointment

E-mail: [agupta1@olemiss.edu](mailto:agupta1@olemiss.edu)

Zoom: <https://olemiss.zoom.us/j/83038305405>

Class Room: Lewis 109

Lab Room: Lewis 203

Office: Lewis 208

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Lab Instructor: Mr. Thomas Jamerson ([thomas@phy.olemiss.edu](mailto:thomas@phy.olemiss.edu))

Lab TA: Mr. Dinura Hettiarachchi ([dhettiar@go.olemiss.edu](mailto:dhettiar@go.olemiss.edu))

Lab Webpage: [Link](#)

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## Course Description

Intermediate description of electromagnetic wave propagation, and the physics of waves; topics in general wave phenomena, and geometrical and physical optics, including interference diffraction, polarization, and quantum optics; lab exercises in physical and geometrical optics.

## Course Objectives

At the completion of this course, the student should be able to describe optical and general wave phenomena in terms of the ray, wave and particle models and make appropriate use of these to solve problems. They should also be able to quantitatively link diffraction, interference, reflection and transmission phenomena to the physical properties of waves, and the interaction of light with matter and materials.

## Textbook

Optics, 5th Ed., by Eugene Hecht, ISBN-13: 978-0133977226.

## Topics Covered

- Properties of waves
- Electromagnetic waves

- Ray optics
  - Propagation in materials, at boundaries
  - Image formation
  - Lens systems
- Physical optics and wave phenomena
  - Polarization
  - Diffraction
  - Interference
  - Coherence
- Modern Optics
  - Quantum Physics
  - Lasers
- Selected topics (fiber optic waveguides, etc...)

## Grading

Lab, Homeworks, and Exams have the following weightage in the grand total:

|             |  |
|-------------|--|
| Laboratory  | 25% (NOTE: you must earn at least 60% of these points to pass the course.) |
| Homeworks   | 25%  |
| Exam 1      | 12%  |
| Exam 2      | 12%  |
| Final Exam  | 26%  |
| <hr/>       |  |
| Grand Total | 100%   |

## Grading Scale

$90\% \leq A \leq 100\%$

$80\% \leq B < 90\%$

$70\% \leq C < 80\%$

$50\% \leq D < 70\%$

$F < 50\%$

## Evaluation

### Laboratory

The laboratory part of the course requires two hours a week. The students will be broken into two groups, and each student will attend one of the sessions each week. The precise times of

the labs will be scheduled during the first week of classes. Laboratories will meet each week after the second week of class. Note that some take-home labs may be given. Materials will be provided in those cases. Lab reports that are more than two weeks overdue will not be accepted. Late reports will be penalized.

## Homeworks

Homework will be due weekly via Blackboard on the due date (Fridays at 11:59 pm CT). You need to upload your clearly written work as a single PDF file on Blackboard. Students are encouraged to work together to solve homework problems, however, no student should copy solutions wholesale. Homework must be completed by the deadline for full credit, but can be completed after the deadline for partial credit by requesting an extension.

## Exams

There will be two mid-term exams and a comprehensive final, as shown on the schedule below. All exams will be closed-book written exams. The dates of the midterm exams and final will not change unless class is canceled for unforeseen reasons (weather, emergency, etc.). The chapters covered on each exam may change, if needed. No make-up exams will be given unless arrangements are made in advance. If you miss an exam or the final without making prior arrangements, you will receive a zero.

## Important Dates

Please see the UM academic calendar (<https://registrar.olemiss.edu/spring-2024/>).

## Examination Dates

Exam dates and topics are subject to change. The final exam date is fixed and cannot be changed.

- Exam 1: 02/20
- Exam 2: 04/02
- Final Exam: Thursday, May 9, 12:00 noon - 3:00 pm

## Course Policies

### Attendance Policy

Attendance is required. If a student is absent for more than 3 class meetings during the semester, **the final calculated grade will be reduced by a letter grade** when final grades are assigned. The lab requires two hours of in-person attendance per week. If you are unable to attend in-person for any reason, I will make every effort to accommodate you. Note that allowances will be made in case of illness due to covid-19 or other illness. University of Mississippi policy requires that attendance be verified for every student during the first two weeks of classes. If you must be absent for tests, it is your responsibility to contact me before the test to determine whether the absence will be excused and whether the test will be rescheduled. For unexpected test absences, you must contact me by email, video meeting or telephone within 24 hours after the absence or the test will not be rescheduled under any circumstances

## Academic Integrity and Honesty

Every student of the University of Mississippi, by virtue of choosing to be part of the university community agrees to abide by the University of Mississippi Creed and the UM Academic Integrity Policy which covers academic integrity. Cheating on any assignment is forbidden and, in this course, will result in a zero grade on the given assignment. If a second case of cheating occurs, this will result in an F for the entire course. Students should familiarize themselves with the UM Academic Integrity Policy which is available in the Course Documents folder on Blackboard.

UM Creed The University of Mississippi is a community of learning dedicated to nurturing excellence in intellectual inquiry and personal character in an open and diverse environment. As a voluntary member of this community:

- I believe in respect for the dignity of each person
- I believe in fairness and civility
- I believe in personal and professional integrity
- I believe in academic honesty
- I believe in academic freedom
- I believe in good stewardship of our resources
- I pledge to uphold these values and encourage others to follow my example

All materials distributed electronically and in hard copy in this class are protected under intellectual copyright. Any attempt to upload these documents onto the Internet (or to distribute them by some other means) or to profit from the distribution (by Internet or other means) of these documents constitutes theft and will be in violation of intellectual property law and the UM Academic Conduct Code unless expressly permitted for by the instructor. Accessing such materials for your own use is also in violation of the UM Academic Conduct Code. Additionally, the distribution of your own class notes via the Internet or other means, or access of such materials, is strongly discouraged except for occasional loaning of notes to students concurrently enrolled in the class.

## University of Mississippi Access and Inclusion

The University of Mississippi is committed to the creation of inclusive learning environments for all students. University policy calls for reasonable accommodations to be made for students with disabilities on an individualized and flexible basis. It is the responsibility of students with disabilities, however, to seek available assistance at the University and to make their needs known. The University offices that help to ensure equitable access for students with disabilities are the Office of Student Disability Services, the Office of Equal Opportunity and Regulatory Compliance (The Executive Director of Equal Opportunity and Regulatory Compliance is also the ADA Coordinator), and the Office of the University Attorney. Students can contact Student Disability Services at 662-915-7128 so that office can facilitate the removal of barriers and ensure you have equal access to the same opportunities for success that are available to all students.