Instructor
Dalziel Wilson
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Office hours
TBD.

Teaching Assistants
Mitul Dey Chowdury & Christian Pluchar

Course objectives
OPTI-210 will introduce students to concepts from physical optics, including:

- Mathematical tools used to describe waves (e.g. complex numbers)
- Maxwell’s equations and the electromagnetic wave equation
- Plane electromagnetic waves
- The Lorentz oscillator model of light-matter interaction.
- Reflection and refraction at a dielectric interface
- Thin film interference and the Fabry-Pérot cavity
- 1D Fraunhofer diffraction: single and double slit diffraction
- 2D Fraunhofer diffraction: square and circular apertures (Airy disks)

Learning outcomes
After completing the course, students should be able to

1. Explain the concept of wave motion as applied to optics.
2. Describe the propagation of plane-wave optical fields
3. Explain the microscopic origin of material optical properties.
4. Analyze transmission and reflection at an interface.
5. Analyze multiple beam interference devices.
6. Analyze simple problems involving optical diffraction of waves.

**Schedule of activities and topics**

The class will consist of

- Two 80-minute lecture sessions per week.
- Ten problem sets distributed evenly over the semester.
- Two in-class mid-term exams plus a final exam.

Lectures will cover the following topics, in chronological order

1. Basics of wave motion [4 lectures]
2. Maxwell’s equation in integral and differential form [4 lectures]
3. Maxwell’s wave equation and properties of the plane-wave solution [8 lectures]
4. Reflection & refraction at an interface [6 lectures]
5. Polarization and its description [6 lectures]
6. Interference and the Fabry-Perot [6 lectures]
7. Basic concepts of diffraction by planar objects [6 lectures]

**Required materials**

Two textbooks are required for the class:


Both will be on reserve at the College Reading room and should be available at the UA Bookstore.

**Grading**

Grades will be based on the following:

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<tr>
<th>Component</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Homework</td>
<td>(30%)</td>
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<tr>
<td>Midterm exam 1</td>
<td>(20%)</td>
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<tr>
<td>Midterm exam 2</td>
<td>(20%)</td>
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<tr>
<td>Final exam</td>
<td>(30%)</td>
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Grading policy: A: 90-100%, B: 75-79%, C: 60-74%, D: 50-59%, E: ≤49%

Note: Homework is governed by the honor system. Discussion with others is encouraged, but the work you hand in must be your own.

**Absence and participation policies**

Attendance is required at all lectures and strongly encouraged at all discussion sections.

In accordance with UA policy, absences for any sincerely held religious belief, observance, or practice will be accommodated where reasonable: policy.arizona.edu/human-resources/religious-accommodation-policy. Absences pre-approved by the UA Dean of Students (or dean’s designee) will also be honored.
Final Examination Date and Regulations
The date and time of the final exam can be found at http://www.registrar.arizona.edu/schedules/finals.htm.

Final Exam Regulations can be found at https://www.registrar.arizona.edu/courses/final-examination-regulations-and-information.

Classroom behavior policy
To foster a positive learning environment, students are asked to refrain from texting, chatting, reading a newspaper, making phone calls, or surfing the internet.

Threatening Behavior Policy
In accordance with the UA Threatening Behavior by Students Policy, threats of physical harm to any member of the University community, including to oneself, will not be tolerated. See http://policy.arizona.edu/education-and-student-affairs/threatening-behavior-students.

Academic integrity policy
Students are expected to adhere to the UA Code of Academic Integrity as described in the UA General Catalog: http://deanofstudents.arizona.edu/academic-integrity/students/academic-integrity. In particular, plagiarism is strongly discouraged. See "Grading" for note about homework.

Nondiscrimination and anti-harassment policy
Students are expected, together with the instructor, to foster an environment that encourages expression of ideas without fear of harassment. As such, bullying and discrimination, as described in UA’s Nondiscrimination and Anti-harassment Policy, http://policy.arizona.edu/human-resources/nondiscrimination-and-anti-harassment-policy, will not be tolerated.

Accessibility and accommodations
Students faced with accessibility challenges, for example due to pregnancy or due to a disability, will be given reasonable accommodation. Please consult the Disability Resource Center (520-621-3268, https://drc.arizona.edu/) for details.

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