PH3210 Optics

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Laboratory: Tolga Yapici (office: Dow 836 , Email: tyapici@mtu.edu)
Joe Wilm (office: SPS Lounge, Email: jdwilm@mtu.edu)

Office hours: By arrangement (email/phone).

Instruction: 1.05-1.55 pm (Tuesday, Thursday), Fisher 132.

Laboratory: 3:05-5:55 pm (Tuesday), Fisher B003 (Electronic/Optics Lab)

Course Description:
This course is designed to introduce the important concepts on geometrical and physical optics. The course consists of two sections: A) instruction and B) laboratory. Topics in geometrical optics include ray analysis, lenses, prisms, and optical fibers. Topics in physical optics include polarization, interference, interferometry, and diffraction. In the laboratory section, we will explore optics through experiments in thin lenses, fiber optics and communication, interferometer, diffraction, filters, lasers, and frequency conversion.


Course Rationale:
Provides an in-depth look at classical and modern optics, including a lab experience. This course is required for physics and applied physics majors.

Grading:
The grade of this course will be evaluated based on your academic performance, effort, and learning attitude in both the instruction and laboratory sections.

(A) Instruction (60%):
You are required to read the text before attending each lecture (at least 1 hour) and also review your text after the class (at least 1 hour). Assignment will be given about once in a week. These assignments will be collected before the class of the submission day. Discussion on these assignments will be conducted in the class after the grading. In addition, both midterm and final exams will be scheduled for this course. Questions in the exams will be based on the important concepts that you have learned in the assignments, instruction, and laboratory sections. Class participation, learning attitude, and exams will contribute to the grade of this section.

(B) Laboratory (40%):
You are required to read up the instruction, and the theory of the experiments before each experiment. All experiments require a report written in a format to be discussed. Reports are due before the beginning of the next experiment. Your grade for this section is based on your reports, lab participation, and attitude in the lab.
Course Syllabus and Schedule (2011 Fall)
This is a guideline on the topics that will be covered in the instruction and the schedule for the exams. Modification is anticipated to account for students’ interest and progress.

A. General Optics:
1). The nature of light: Waves and photons (Chapter 2 and 3) (Week 1)
2) Interaction between light and matters: Dispersion, absorption and scattering (Chapter 3) (Week 2)
3) The propagation of light: Transmission, reflection, refraction (Chapter 4) (Week 3 and Week 4)

B. Geometrical Optics:
4) Lenses, prism, optical fiber etc (Chapter 5) (Week 4 and week 5)

5). Midterm Exam (mid of Oct or TBA) (Chapter 2 to 5)

C. Physical optics:
6) The superposition of waves (Chapter 7) (Week 6)
7) Polarization (Chapter 8) (Week 7 and Week 8)
8) Interference (Chapter 9) (Week 9 and week 10)
9) Diffraction (Chapter 10) (Week 10 and Week 11)
10) Fourier Optics (Chapter 11) (Week 11 and 12)

-Thanks giving Recess-
(Nov 21-Nov 27)
11) Basics of Coherence Theory (Chapter 12) (Week 13)

D. Modern optics
12) Laser and nonlinear optics (Chapter 13) (Week 14)

Final Exam (Chapter 5, 7-13) (Final Week)
Grading:

The weight attributed to each segment of the course is as follows:

- Assignment, class participation, and learning attitude in the instruction section  15%
- Mid-term exam           15%
- Final exam             30%
- Lab participation, attitude in the lab, and quality of your reports  40%

For each of the four segments of your grade, you will be given a numerical score from 0 to 100. For an indication of your standing relative to the class, you may use the following table:

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<thead>
<tr>
<th>Letter Grade</th>
<th>Score Range</th>
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<tbody>
<tr>
<td>A</td>
<td>90-100</td>
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<tr>
<td>AB</td>
<td>85-89</td>
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<tr>
<td>B</td>
<td>78-84</td>
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<td>BC</td>
<td>73-77</td>
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<td>C</td>
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<td>D</td>
<td>54-61</td>
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<td>F</td>
<td>0-53</td>
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Letter grades for the course will be based on the above scheme with the provision that the cutoffs are subject to change. All questions regarding the grading policy for the course should be addressed to the lecturer. Questions regarding the grading of lab participation, attitude in the lab, and effort on your reports should be addressed to your recitation instructor.

Notice MTU complies with all federal and state laws and regulations regarding discrimination, including the Americans with Disabilities Act of 1990 (ADA). If you have a disability and need a reasonable accommodation for equal access to education or services at MTU, please call Dr. Gloria Melton, Associate Dean of Students, at 7-2212. For other concerns about discrimination, you may contact your advisor, department chair, or the Affirmative Action office.