

Lectures: Tuesdays and Thursdays 12:30 PM - 1:45 PM **Room:** ECE 125

Semester Credit Hours: 3

Instructors:	Department:	Office:	E-mail:
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Office Hours (Dr. Wang): Thursdays 9:30 AM – 10:50 AM (ECE 101G, in person)
 Tuesdays 9:30 AM – 10:50 AM (Zoom, <https://ndsu.zoom.us/j/2155692081>)
Please email for appointment if you need.

Textbook: *Optics* (5th Edition) by Eugene Hecht
ECE/PHYS 411/611 Prerequisite: PHYS 252 (University Physics II)

Course Objective

At the end of this course the students will be able to successfully apply optics in their respective disciplines. This will be accomplished through hands-on use of state-of-the-art equipment in the co-requisite laboratory course in conjunction with classroom discussions in which the students will learn the most important concepts and phenomena of optics.

Course description

Today, light pervades our lives in ways that could not have been imagined a few decades ago. Light is at the core of technologies ranging from computing and communications to surgical techniques. Optics, the study of light, plays the role of an enabling science since it touches essentially every field of technology.

This is a 3 semester-credit-hour senior undergraduate/first year graduate level course with minimum course prerequisites (University Physics II, electricity and magnetism) and the co-requisite Physics/ECE 411L/611L. Lectures will be based on the text *Optics, Fourth Edition*, by Hecht to provide the background required for performing the experiments.

The anticipated schedule is as follows:

- First 9 weeks: Two 75-min lectures per week, except holidays (details below).
- 10th through 15th week: The lab will be available in all the lectures for work on major-related experiment.
- 16th week: Students present results in the classroom.

A major experiment related to the student's academic major (engineering, chemistry, physics, etc.) using optics will be selected by each pair for the last four-week project. Students will write a research paper on this experiment and present their results to the class. Students will be graded in this course on their paper, their presentation and their explanation of the results and will receive a separate laboratory grade based on their experimental apparatus and approach.

Tentative Course Outline

Week	Topic	Text Assignment
1	Properties of waves	Ch 1, 2
2	EM nature of light	Ch 3.1- 3.4
3	Dispersion	Ch 3.5-3.7
4	Index of refraction	Ch 4.1-4.5
5	Reflection S/P	Ch 4.6-4.9
6	Lenses, stops	Ch 5.1-5.3
7	Mirrors/prisms	Ch 5.4-5.5
7	Mid-term exam – Oct. 21st (Thursday)	

8	Fiber optics and sensors	Ch 5.6
9	Vibrations. Waves	Ch 7.1-7.2
10	Polarization	Ch 8.1-8.3 8.5-8.6
11	Interference	Ch 9
12	Diffraction	Ch 10
13	Major related project	
13	Exam 2 – Nov. 30 (Tuesday)	
14	Major related project	
15	Major related project	
16	Project presentation	
	Final Project – Dec. 14th by 11:59pm	Comprehensive

Classroom Expectations

Students are expected to attend all classes. Lecture attendance will not be factored into the final grade, but active daily participation is essential. Students are expected to read the day's lesson prior to coming to class and to be prepared to discuss it in class. Material may be presented that is not in the text or it may be presented in a different way. Students are responsible for all material presented in class including that missed during excused absences. If you miss a class, it is your responsibility to obtain the class notes from a classmate.

Format: The class consists of 75-min. lectures, two times per week through **HyFlex mode**. Homework will be assigned weekly; lab report will be assigned bi-weekly. A few in-class quizzes (participation is the key), one in-class midterm exam, one take-home end-of-semester exam, and one final project.

Grading Policy:

- Homework and Lab assignments – 30% (turn in from blackboard on the due date)
- Midterm exam – 20%
- End of semester exam – 20%
- Final Project – 20%
- Quizzes, Class/Lab participation – 10%

Letter grade thresholds:

A: 90% – 100% B: 80% – 89%
 C: 70% – 79% D: 60% – 69%
 F: < 60%

Note: These scores guarantee the minimum grade

The exams will include conceptual questions requiring short answers, derivations, and quantitative problems similar to the assigned homework problems. Letter grade assignment will be determined at the end of the semester by the instructors based on the student's overall course percentage.

Quizzes:

Quizzes will be frequently given in class. There will be no make up for quizzes due to absences unless there is a strong reason for the absence.

Exam dates: Midterm exam – Thursday, **Oct. 21, 2021**, 12:30-1:45 pm, in class or Zoom.

Take home exam – Tuesday, **Nov.30. 2021**, 12:30-1:45 pm.

Final Project – Final reports: 2-page IEEE conference style (**Dec. 14 by 11:50pm**)

* No lecture classes on Oct. 21, Nov. 11 (Veterans Day), Nov. 24-26 (Thanksgiving); No lab during the week of Oct. 13-Oct. 22.

Exam conditions

Both exams are Open-book Tests. Mid-term problems will be available on BB on the exam date at 12:25pm. Please submit the exam answers on BB before the scheduled time on the due date. No paper submission of the exam accepted. If images are taken for the exam submission, please make sure the quality of the photos are good for grading. It is the students' responsibility for a good quality of pictures or photos of the exam answers so that the grader/instructor can see clear for answers. If special circumstance prevents submitting exams on time such as illness or remote connections, please contact the instructor for make-up plans. After the exam, if you think it was graded incorrectly, write a note explaining why on a new sheet of paper, tuck it into your exam, and give it to me **within one week of receiving it**, and I will take a look at it.

Graduate level courses

Students attending the ECE/PHYS 611 courses will need to answer additional sections in the Exams to receive full credits.

Homework policies

Homework is due on the assigned due date at **5:00pm on Bb**. No paper submission of the homework accepted. Homework **will be submitted on Bb or directly email an E-copy of your homework to grader**. Images of the complete homework are acceptable as submission. It is the students' responsibility for a good quality of pictures or photos of the homework so that we can see clear for answers. If the image quality is low, an email request will be sent to you for a replacement of the homework photo or image. So please keep your hard copy of the homework till your grade is shown in Bb. First two late submissions could be compromised. However, since 3rd time, the late homework will be **penalized 25%** of the points. If special circumstance prevents submitting homework on time such as illness or remote connections, please contact the instructor for make-up plans. Any homework submitted after the releasing of the homework keys, will be recorded as zero.

Class taking policies

- In-person, virtual or mixed: due to the pandemic and tracking potential outbreak, this class is highly recommended to keep the options from the beginning. However, while the class is remote (e.g. Mondays' class or some Wednesdays' class, or some reason that instructor is sick), students choosing in-person classes feel free to have classes at home remotely. It is not encourage to switch remote to in-person unless you have special needs.
- Required by the ND Department of Health, **seat chart** is needed to track and notify "close contact" in case a COVID-19 is tested positive in the class. To meet this requirement, the seat chart and sign-in sheet will be provided and recorded based on the seating locations since August 26, 2021. **It is encouraged to stay in the same seat for all the classes throughout the semester**. Sign-in will be performed by Instructor for lectures and TA for labs in the beginning of each class.
- **Well-being check:** It is required to self-check your well-being before you enter the classroom for each class. If you are sick or have any symptom of the COVID-19 (fever of 100.4 °F or above, cough, etc.), please stay home and rest. Please also contact your instructor to notify your absence. The classes will be recorded and you will be able to access these resources on Bb to make up the classes you miss in the case of your sickness or needed isolation.
- **Proper face mask required in-person class:** NDSU strongly recommend students and faculty to wear face coverings in classrooms. Wearing face coverings helps reduce the risk to others in case you are infected but do not have symptoms.
Proper means: 1) washing your hands **before** you wear face mask and no touch your mask. 2) wearing the face mask properly, please see figure 1. 3) wearing right mask, please refer figure 2.



Fig.1



Fig.2

Special needs

Students who need accommodation due to disability or who have accessibility considerations should contact Disability Services at 701-231-8463. If an individual chooses not to wear a face covering in a space where it is required, the following process should be followed.

1. Inform the individual of the face-covering policy. Explain how face coverings protect others by reducing the possibility of infection. Ask the individual to comply with the policy.
2. If the individual continues to violate the face covering policy, refer to Human Resources (for staff), College Dean (for faculty), and to the Dean of Students Office (for students).

Veterans and soldiers

Veterans and student soldiers with special circumstances or who are activated are encouraged to notify the instructor in advance.

Academic honesty

All work in this course must be completed in a manner consistent with NDSU University Senate Policy, Section 335: Code of Academic Responsibility and Conduct. Violation of this policy will result in receipt of a failing grade. Please read: <http://www.ndsu.edu/fileadmin/policy/335.pdf>

Well-being Resources on Campus and in the Community

As a member of the NDSU community, resources are available for you should you need help in dealing with adverse reactions to things happening in the world today. A variety of resources are listed below:

For students on campus and remotely (telehealth):

Counseling Services: 701-231-7671; Disability Services: 701-231-8463;

Student Health Service: 701-231-7331

In a crisis or emergency situation:

Call University Police: 701-231-8998

Call 911

Go to a Hospital Emergency Room

Go to Prairie St. Johns for a Needs Assessment: 701-476-721 (510 4th St. S.)

Call the First Link Help Line: 1-800-273- TALK (8255) or 2-1-1

Call Rape and Abuse Crisis Center: 701-293-7273

Others:

1. Class and lab participation are highly recommended although remote learning of lecture class is an option for students. The student is responsible for all the material discussed in class whether or not the student was in class.
2. Student has questions about the grading of a particular exam problem, homework, and quiz problem. Please directly discuss these concerns with the instructors. Lab issues or questions please

look for the assistant from TA. If TA can not handle, she will contact instructor for further solutions.

3. Questions during class are highly encouraged.
4. Usage of cell phones for communication (voice or text), newspapers, magazines, etc. is not allowed during lectures.
5. No loud discussion in class is allowed. Please ask instructor if you have any question.