

PHY300, Waves and Optics Syllabus, Fall, 2026

The physics of oscillations and waves, from mechanical waves to light waves to electron waves. Topics include resonance and normal modes of coupled oscillators, the wave equation and wave propagation, interference and diffraction, polarization, imaging and coherence. This course has an associated fee. Please see www.stonybrook.edu/coursefees for more information.

Professor: Laszlo Mihaly , Physics Building B145 (on the bridge to the Math building), Email: Laszlo.mihaly@stonybrook.edu. Office hours Monday 3:10-4:10pm

Teaching Assistants:

Nai-Yu Tsai <nai-yu.tsai@stonybrook.edu>, Office hours Tue. 2:00-3:00pm in A-129 or A-131

Matthieu Foresi matthieu.foresi@stonybrook.edu, Office hours Wed. 4:00-5:00pm in A-129 or A-131

Textbooks: 1. Vibrations and Waves by Anthony French, 2. Modern Optics by Grant R. Fowles

Lectures/Labs: MW 11:00am-12:20 pm, F 11:00am-12:50 pm

WEB site: Brightspace

Learning Objectives

1. Students will demonstrate mastery of physics concepts related to oscillations, waves, and optics, and will be able to think critically and apply appropriate concepts to qualitative problems.
2. Students will demonstrate the ability to apply mathematical reasoning, including partial differential equations and linear (matrix) algebra, to quantitative physics problems.
3. Students will demonstrate scientific communication skills through thoughtful discussion, collaborative problem solving, and interpretation of experimental results.

Course Format

Lectures and laboratory experiments are integrated into a Studio Physics format, where the lectures and labs are integrated, and supervised by the lecturer and two TAs.

Grading: Worksheets 5%, lab quizzes 5%, lab reports 15%, homework 10%, midterm exams 30%, final exam 35%.

Exams

There will be two midterms and one final exam. Midterms will be held on Fridays during class time (see the course schedule). All exams are closed-book, with no external help permitted. A formula sheet will be posted on Brightspace and provided with each exam. Bring a scientific calculator to the exams. Use of smart phones or other networked devices is strictly prohibited.

Missed midterm exams will be excused only with a doctor's note. There are no make-up midterms; instead, the score on the other midterm will be counted twice in the final grade calculation.

Worksheets

A worksheet are posted on the course website and will be distributed in class before the Monday lecture. Most worksheet questions are completed during lecture. Occasionally, students may be asked to answer a few questions as homework.

The final section of most worksheets is about the Friday lab experiment. For the labs, students should form teams of no more than four members. Instructors occasionally reassign students to balance group sizes or for other logistical reasons. The full names of the lab team members must be indicated on the worksheet.

Data must be collected and recorded during lab time. When possible, a preliminary evaluation of the data should also be performed during lab. The experimental results, along with a short evaluation of the data, must be included in the submitted worksheet. The lab worksheet must be signed by a TA before the end of the lab session. Worksheets must be submitted to Brightspace and they are due on Mondays at 11:59 p.m.

If a Friday lab is missed with a valid medical or other documented excuse, a make-up time may be arranged with the TAs. If a lab is missed without an excuse, the corresponding worksheet will receive zero points.

Required Elements of a Finished Worksheet

1. Short answers to all questions. Graphs must include labeled axes and units.
2. Very brief notes on the lab procedure, as needed.
3. Clearly labeled data tables with units. If data were entered to a computer directly, without manual recording, attach data as an appendix in the form of a printed pdf file.
4. A graph of the data, with labeled axes and units. (Except when data were taken with LabQuest).
5. A theoretical curve plotted on the same graph, when possible.
6. Numerical results with appropriate units.
7. A brief discussion of experimental uncertainty, if required in the instructions.

Additional sheets of paper may be used as needed.

Lab Quizzes

To prepare for Friday labs, you must watch a short video and complete the associated quiz on Brightspace. If questions arise during the lab, you may revisit the relevant portion of the video. The quiz deadline is Friday at 11:00 a.m. (before the lab session).

Lab Reports

Two formal lab reports are required, marked by red in the course schedule. The associated worksheets must be completed as usual. In addition, each formal report must include:

- A complete description of the apparatus and experimental method
- A discussion of the relevant theory
- More extensive data analysis and error evaluation

A sample report is posted on Brightspace. Reports may not exceed eight pages, including the graphs of the experimental data and the theory. Data tables may be included in an appendix.

The due date of the formal lab reports are on Fridays at 11:59 p.m, on the weeks published in the course schedule and Brightspace.

If a student misses a Friday lab associated with a formal report, the lab must be made up at a time arranged with the TAs, and the report must be submitted by an agreed-upon deadline. The latest possible deadline is the date of the last lecture of the semester. Failure to submit a required formal report will result in a six-point reduction in the final letter grade (e.g., from A to C or from B to D).

Homework

The homework problems are posted on Brightspace in pdf and Windows Word formats. The solutions should be uploaded to Brightspace in the “Assignments” section. **Do not write your name or student ID on the solution.** The upload to Brightspace will take care of that, your id will be recorded. We will experiment with homework grading by AI (Claude Code) and we do not want to submit the student’s personal information to our AI friend.

Homeworks are due on Tuesday at 11:59 p.m., following the week in which the topics were covered in lecture.

Brightspace Submissions

For worksheets you can either answer the questions with handwritten text inserted into the empty space on the paper, or you can download the Word document and fill in your answers in Windows Word. For submission the acceptable file formats are: 1. Word document, 2. pdf file generated from Windows word, 3. pdf or photo (jpg, jpeg, gif or png) file generated from handwritten text. For homeworks, only the option #3 is accepted (handwritten text). Make sure that the handwriting is legible, the contrast is good, there are no shadows and the page breaks in the pdf follow the page breaks of the written text.

Most smartphones have a “Scan Documents” feature that can generate pdf file (e.g. in iPhone go to Notes, click on the paper clip, select “Scan Document”).

For the formal lab reports you should use LaTeX, Windows Word or something similar. No handwritten content, please.

Brightspace Submissions, Late Penalties

Late submissions incur a 10% penalty per workday (Saturday, Sunday, and school breaks do not count). For example, if a worksheet is worth 10 points and is submitted on Tuesday instead of Monday, the maximum score is reduced to 9 points; on Wednesday, to 8 points. All required work must eventually be submitted, even if the maximum score is reduced to zero.

Working with Others

Collaboration is encouraged for worksheet questions and during lab experiments. If you are present and actively participate in data collection, sharing raw data in any form (e.g., Excel files) is allowed. For data evaluation (items 5–7 in the worksheet requirements), collaboration is permitted, but direct sharing or copying is not. You may share raw data tables and graphs of raw data, but fitted curves and evaluated results must be produced independently. While the raw data used for the formal lab report is shared, the report itself should be prepared by each student alone. Copying or paraphrasing another student’s report is strictly prohibited.

Copying Homework Solutions from the Internet, Using Artificial Intelligence

Solutions to textbook problems can likely be found online. If you copy them, graders may recognize this but will not penalize you. However, doing so is strongly discouraged, as it will leave you unprepared for exams. Remember, homework counts for only 10% of the final grade, whereas the exams together account for 65%.

The use of AI tools is encouraged, with an important caveat. As with online solutions, you should use AI only after making a serious attempt to solve problems on your own. Once you are done with the solution you may want to check if the AI solution agrees with yours. If there is a disagreement, you may learn a lot by trying to figure out the reason for it. Again, your goal should be to learn and practice the material, and producing perfect homeworks with outside help will lead to failure in the exams.

Student Accessibility Support Center Statement. If you have a physical, psychological, medical, or learning disability that may impact your course work, please contact the Student Accessibility Support Center, Stony Brook Union Suite 107, (631) 632-6748, or at sasc@stonybrook.edu. They will determine with you what accommodations are necessary and appropriate. All information and documentation are confidential.

Academic Integrity Statement. Each student must pursue his or her academic goals honestly and be personally accountable for all submitted work. Representing another person's work as your own is always wrong. Faculty is required to report any suspected instances of academic dishonesty to the Academic Judiciary. For more comprehensive information on academic integrity, including categories of academic dishonesty please refer to the [academic judiciary website](#).

Critical Incident Management. Stony Brook University expects students to respect the rights, privileges, and property of other people. Faculty are required to report to the Office of Student Conduct and Community Standards any disruptive behavior that interrupts their ability to teach, compromises the safety of the learning environment, or inhibits students' ability to learn. Further information about most academic matters can be found in the Undergraduate Bulletin, the Undergraduate Class Schedule, and the Faculty-Employee Handbook.

Accessibility. Stony Brook University is committed to ensuring a supportive, inclusive, and equitable learning environment for all members of our community, which includes upholding the principles of [Title II of the Americans with Disabilities Act \(ADA\)](#). As a student in this course, it is important to recognize your role in ensuring that all classmates, including those who use assistive technologies, can fully engage with and comprehend the course content. Therefore, any digital materials you create and share, such as assignments, presentations, or shared documents, must be designed to be digitally accessible using the most up to date version of the [WCAG 2.1 Level AA guidelines](#). Accessible practices include, but are not limited to, providing alternative text for images, using clear heading structures, and ensuring captions for any video or audio you incorporate. Guidance and assistance in making your digital content accessible can be found on the [Accessibility Resources for Students](#) page. For additional support, please visit [Deque University](#).

Religious Holidays: If the schedule of homework, exams or other assignments conflicts with your religion's Holidays, please let me know in an email by the end of the first week of instructions and I will do my best to accommodate your needs. Please note that I cannot make changes to the course schedule after the first week of classes. No consideration will be made if someone approaches me in this matter at a time close to the due date or the exam date.

Week of	Topic	Reading	Worksheet	Friday Lab	Homework/Lab Reports
24-Aug	Simple Harmonic Oscillator	French Ch 1, 2	#1	Simple Harmonic Oscillator	#1 French 1-1,1-2,1-5,1-6, 2-1,2-2,2-3,2-4
31-Aug	Damping, Driving, Energy	French Ch 3,4	#2	Damped Oscillator	#2 French 3-1,3-13,4-3,4-5,4-10
7-Sep	Two Coupled Oscillators	French Ch 5	#3	Two Coupled Oscillators	#3 French 4-16, 5-2, 5-4, 5-9, 5-10
14-Sep	N Coupled Oscillators	French Ch 5	#4	LC Circuits	#4 French 5-13, 5-16
21-Sep	Strings, Fourier Series	French Ch 6	#5	String Demo (no lab)	#5 French 6-1,6-2,6-6, 6-11, 6-12,6-14
28-Sep	Review			(no lab)	Midterm 1
5-Oct	Travelling Waves	French Ch 7	#6	Vibrating Rod, Sound waves	#6 French 7-1, 7-2,7-3,7-4, 7-6,7-8, 7-9 Lab report #1 LC circuits
12-Oct	(Fall break) EM Plane Waves	Fowles Ch 1	#7	(no lab)	#7 Fowles 1.2,1.3,1.5,1.6
19-Oct	Polarization	Fowles Ch 2	#8	Polarization	#8 Fowles 2.1, 2.3, 2.8, 2.10, 2.12
26-Oct	Reflection & Refraction	Fowles Ch2	#9	Reflection & Refraction, Thin lens	#9 2.16, 2.17, 2.22,
2-Nov	Review			(no lab)	Midterm 2
9-Nov	Ray Optics	Fowles Ch 10, pp294 - 301	#10	Ray Optics	#10 Fowles 10.2, 10.4, 10.5 Lab report #2 Polarization
16-Nov	Interferometers	Fowles Ch 3,4	#11	Interferometers	#11 Fowles 3.2, 3.3, 4.1 (see eqns 4.9 and 4.20), 4.5
23-Nov	Thanksgiving				
30-Nov	Diffraction	Fowles Ch 5	#12	Diffraction	#12 Fowles 5.4, 5.9, 5.12 (Note typo, should be $2h/b+1$)
7-Dec	Review				

12-Oct Fall break

2-Oct Midterm 1 covers worksheets #1 - #4

23-Oct GPNC, W deadline

6-Nov Midterm 2 covers worksheets #5 - #8

9-Dec 11:15am - 1:45pm, Final exam, covers 50% worksheets #1- #8, 50% #9 - #12