

## PHYS273: “Introductory Physics: Waves”

- Description: “Oscillations and AC circuits using complex variables, Fourier series and integrals, waves on strings, sound; electromagnetic waves from Maxwell’s equations in differential form; physical optics.” (3 credits). The physics and mathematics discussed in this course are interesting and important in their own right, but *more importantly, the various approaches used in this course constitute important paradigms in virtually all subjects of advanced physics.*
- Prerequisites: MATH241 and PHYS272. Corequisite: PHYS274.
- Instructor: [Prof. Ian Appelbaum](#). Find me at [Physical Sciences Complex](#), Rm. 2154.  
Phone: x5-0890 / e-mail: [appelbaum@physics.umd.edu](mailto:appelbaum@physics.umd.edu)  
Please arrange a meeting time via email to discuss grades or other personal situations including absences. Questions about the course material should be directed to the asynchronous Q&A board on the course webpage at <https://piazza.com/umd/fall2018/phys273>.
- TA: Mr. Steven Tran, [PSC SB0243](#).  
Phone: x4-2070 / e-mail: [stevenjtran@gmail.com](mailto:stevenjtran@gmail.com)
- Course Web Site: All course materials, including this syllabus, homework assignments, solutions, lecture notes, etc. will be posted to the [Piazza page](#).
- Schedule: 12:30pm - 1:45pm, Tuesday and Thursday; Friday 11:00am - 11:50am, in [J.S. Toll 1410](#). I will not follow the text verbatim, so it is very important to attend the lectures.
- Homework: Will be assigned approximately weekly via the Piazza page (Resources tab). Late homework will not be accepted and will receive a grade of 0.
- Book: First ~5 chapters of [Wave Physics](#) by S. Nettel. PDF chapters are free to campus, or you can buy a hardcopy from Springer MyCopy for \$25. Another good, free book on this topic is provided by [D. Morin](#).
- Quizzes: There will be ~5 quizzes held on alternate Fridays. Your lowest quiz grade will be dropped, so there will be no make-ups.
- Honors: The honors version of the course, PHYS 273H, meets at the same time and place as PHYS 273 meets. In addition to the work in PHYS 273, students in the honors section are responsible for an independent research project on a special topic

related to waves. The goal of your research project is to learn in detail about a topic that is not covered in depth in class. At the end of the semester you will submit a paper describing the results of your project.

Project Types: You are free to decide the scope and style of your project, subject to approval by the instructor. Here are several possibilities:

- Independent reading on a special topic. For this type of project, your final paper should be substantial (10-20 pages).
- Study of solutions of Maxwells equation which are more complex than plane waves.
- Write a program to do a complicated wave propagation calculation.
- Build an electronic device that uses a resonant circuit, like an AM radio.
- Holography
- Lasers and quantum optics
- Gravitational waves
- Seismology
- Come up with your own ideas.....

Project Proposal: Write a proposal for your project, including the type of project and its topic. I will approve the proposal or suggest changes. You must turn in your project proposal to me by Friday Oct. 12 for final approval.

- Grading: Your course (letter) grade is determined - at the END of the semester - by your numerical scores on homeworks (20%), quizzes (40%), and a final exam (40%). Honors students will be graded 20%, 30%, 30% respectively, with the remaining 20% from the project.
- Dropping the Course: The [last day to drop](#) the course is Nov. 5.
- [UMD course policy](#)
- Advice:
  - The only way to learn anything is to do it; just listening to me, or reading the book, is insufficient.
  - Do derivations yourself, do the homework, keep up with the class, ask questions, and come to office hours.
  - Avoid the temptation to use online or printed solutions. And, while it is useful for some people to compare their work to others, solve the problems first on your own. You learn physics by solving problems, not by copying them.