

Waves and Optics – Spring 2005

PHYS-365

Instructor and Lab Instructor:

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American University**Email:** harshman@american.edu**Phone:** (202) 885-3479**Office:** McKinley 100**Classroom:** McKinley 15**Class meeting times:** Wednesday, 9:55am-12:35pm**Office hours:** Tuesday 1–3pm, Wednesday 3-5pm, Thursday 3-5pm, or by appointment

The focus of this course is waves and optics. We will first explore the basic properties of oscillating systems, discrete and continuous, free and forced. This will lead us to understanding waves and how they propagate, reflect, refract, interfere and diffract. Along the way there will be many application to sound, music, acoustics, optics, lasers and much more. We also will develop experimental, mathematical and computational tools to help us model and explain physical systems and phenomena.

The course requires credit for a first semester introductory calculus class, such as MATH-221, and credit for an introductory, (typically calculus-based) second-semester physics class, such as PHYS-210/210G.

Course Materials:**Text:** *Waves*, Frank S. Crawford, Jr., photocopied in bookstore**Calculator:** Scientific calculator that can do trigonometric, exponential, and logarithmic functions; graphing capacity not required; graphing capabilities cannot be used during in-class tests.**Communication:** This course will use the Blackboard system of American University for distribution of information outside of class time.**Email:** You must have an American University email account to use this system; if you use an email provider other than American, forward your American mail to that account. On-line quizzes will be taken through Blackboard, on-line discussion sessions will be managed through Blackboard, and solutions to homework and tests will be posted on Blackboard. Check your email and the class website of Blackboard frequently to stay up-to-date. I usually respond fairly promptly to email and it is my preferred method of communication outside of class and office hours.**Discussion Boards:** Please make use of the discussion boards to ask questions, vent frustrations, share neat ideas or websites, etc.**Privacy:** For the record, I can track Blackboard viewing, i.e. count the hits on each page and see who accessed it. However, you can post on the discussion board anonymously, and I really can't see you said it.**Etiquette:** Express yourself freely in this class, in email and on Blackboard. However, be respectful and polite to your fellow students.**Course requirements and grading:** Your final grade will be based on the following:

Class Participation	20%
Homework	20%

Project and Presentation	20%
Take-home Midterm	20%
Take-home Final	20%

Homework: Twelve times during the semester assigned homework will be required to be turned in. The homework assignments will be posted on Blackboard at least one week before the due date. Typically there will be two or three problem and one home experiment. You may work with others to complete these assignments, but you must turn in your own work. This is a super-important part of your grade! You may not copy the homework from someone else, as that is a violation of the AIC. You are encouraged to attempt all the homework on your own before seeking assistance, as that will provide the greatest practice for the tests. Only your best ten homework assignments will count towards your grade.

Class Participation: To receive the full 10% for class participation, you must attend all classes and complete all activities that take place during those classes.

Project: Each student will choose an application of waves and optics or a technique/effect with waves and optics and complete a written (3-5 pages) and oral report (10 minutes). A project proposal is due 16 February in class and will include a paragraph summary of the topic and a list of at least five references that will be used. This will be awarded one fifth of the project grade. A first draft of full length will be due 30 March and I will return it with comments. This draft will be graded primarily for effort and will be awarded one fifth of the project grade. The final written report will be due the last day of class and will be awarded two-fifths of the final project grade. The oral presentation will be presented either the last day of class or during the final and will receive the final fifth of the grade.

Tests and Final: There will be a take-home midterm and a take-home final. They will be open-notes and open-book and will consist of short written answers and free-response problems. You may not work with anyone else on the take-home exams or consult with me. You may seek out resources from the library or the internet if they are well-documented. The final is cumulative.

Regrades: If you feel homework or a test has been misgraded, DO NOT WRITE on it. Write a note on a separate piece of paper and give it to me in class or office hours or slip it in my mailbox in McKinley 102 within one week of the date it was returned. The assignment will be regraded more carefully. Note: your grade may go up OR down based on the regrade. That's the chance you take for me looking at it more carefully.

Succeeding in this class and getting help: To succeed in this class, it is imperative that you interact with the material every day. Physics is like a foreign language, you cannot learn it just from attending class. Make sure you do the readings before class and lab, do all the warm-up quizzes and homework, solve the sample test questions, attend SI sessions, come to office hours. This is a four-hour class, so you should spend *at least* eight hours a week outside of class time thinking about and practicing physics.

On-line discussions: On Blackboard there will be on-line discussion groups. You can you this to ask me questions publicly, discuss homework with your peers and voice concerns and opinions about the material and the class.

Other Blackboard resources: Lots of other good stuff with be on our course's Blackboard site. Check it out regularly.

Office hours: You are super-welcome to come to office hours. We have a good time there. If you can't make any of the times listed above, call or email me, and we can work something out.

Students with disabilities: You should be registered with the University, who will send me a letter describing you special needs. We can accommodate your needs, but occasionally patience will be required.

Academic Integrity Code: Read it and follow it. It is your responsibility to know it and abide by it. Follow all instruction given here or given on a specific assignment or the full due process of the AIC will come down on you.

Excused absences and extensions: Severe illness, religious observance, University business, and family emergency are acceptable reasons for missing class or needing an extension on an assignment. I have the right to request reasonable documentation, in accordance with University policy. Do not notify me of an absence, such as missing an exam or needing an extension, at the last minute. Use email and notify as far in advance as possible. I will be strict about this .