Physics 312 – Wave Phenomena

Wittenberg University
Spring 2009
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http://userpages.wittenberg.edu/jwilliams/courses/Ph312/index.html

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Office Hours: MWF 11:20 – 12:20 PM and by appointment

Class Schedule:

Class Meetings: MWF 10:20 – 11:20 AM Sci 304
Lab Meeting: T 12:30 – 3:10 PM Sci 304
Final: Saturday, May 11, 2009 12:00 – 3:00 PM

Primary Text:

Required
• 2 (possibly more) quadrille-rulled, bound lab notebook

Recommended
• A book of integral tables is always useful. I recommend the Mathematical Handbook of Formulas and Tables in the Schaum’s Outline Series. It is compact, portable and contains much of what you will need in your undergraduate studies.

Course Description

Wittenberg Catalog Course Description: Unified treatment of the general properties of waves, including the mathematical representation of acoustic and electromagnetic waves, refraction, propagation, interference, diffraction, and geometrical optics. One three-hour lab per week.

Prerequisites: Physics 220 and 218. Mathematics 212 and 215 recommended. Writing intensive.

I assume that you have already taken the introductory physics sequence and have a basic understanding of differential and integral calculus. I also assume a basic knowledge of vectors and vector algebra. Additional mathematical concepts will be introduced or reviewed as necessary.

Like all upper-division physics courses, this will be a challenging and, hopefully, rewarding course. A substantial amount of material will be covered this semester, which means that the pace of this course will be rapid. As such, it is imperative for you to keep up to date with the material. It also means that YOU must let me know if the pace is too fast (or slow).

The schedule will be determined and adapted to best fit your needs and interests.
Course Policies:

Attendance: Class participation and attendance in the lecture portion of this course are not mandatory and do not directly contribute to your course grade. However, much of what we discuss in class will be directly related to the exam questions and the homework sets. Therefore, it is in your best interest to attend and be actively engaged in class. If you miss a class, it is your responsibility to get the assignments and to submit them on time. Participation in the laboratory component of this course is required.

Grade Determination: All assignments will be graded on an absolute scale. At the end of the semester a normalization may be applied to the total absolute grades for the entire class to determine each individual's final grade. The course grade will be determined using the scheme below. Given the importance of the laboratory component of this course, you must pass the laboratory component in order to pass this course.

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
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</thead>
<tbody>
<tr>
<td>Homework:</td>
<td>25 %</td>
</tr>
<tr>
<td>Exams:</td>
<td>30 % (to be equally divided among the exams given)</td>
</tr>
<tr>
<td>Lab:</td>
<td>25%</td>
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<tr>
<td>Final:</td>
<td>20%</td>
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Homework: Homework will be assigned throughout the semester and your solutions will due at the start of class on the due date. Your solutions will be returned to you later in the day and you will have a chance to revise your solutions. These revisions will be due at the start of the next class meeting. Each problem is worth 10 points, with up to 5 points possible on your initial submission and the remaining 5 points earned for the revised submission. If your initial solution is correct, no revision will be needed and you will receive all 10 of the available points. To receive full credit, you must make a reasonable effort on the draft version of your solutions. Solutions will be posted after the final version has been submitted. Late solutions will not be accepted.

Your homework solutions should be organized, written, legible (typed or written in pen) and written on one side of the page. Your answer should be clearly labeled (boxed, highlighted, bold, etc.) and you are expected to justify your answer by showing your work and by stating, in words, what you are doing. Full credit will not be given without some words describing the physics being used.

In addition to the homework solutions that you submit, it is expected that you will keep up with the course reading and are prepared for each class meeting.

Exams: Unless otherwise noted, exams will be timed and given in class. You will be allowed to use your brain and a writing instrument. Additionally, a copy of the Mathematical Handbook of Formulas and Tables in the Schaum’s Outline Series will be provided. You are welcome to use your own copy or similar handbook, provided that it is approved by the instructor in advance. The use of anything else is considered a case of academic dishonesty.

The exact date of the exams will be announced in class at least one week in advance. Exams must be taken at the stated times, except by prior agreement. Makeup exams will only be given if there is unavoidable and documented conflict. The final will not be given early, except under extraordinary circumstances. If there is a conflict, it is your responsibility to contact the instructor as far in advance as possible.

Accommodations: Any student with a documented disability who needs to arrange reasonable accommodations must contact each instructor at the beginning of the semester and provide a self-identification letter. To obtain this letter, contact Melinda J. Finkle, the Academic Services Coordinator, at 937-327-7924 in room 206 Recitation Hall.
Regarding Academic Honesty:

The important guiding principle of academic honesty is that you must never represent the work of others as your own. While it is expected that you will abide by the Wittenberg Honor Statement, the following guidelines should help govern your behavior in the course; please request clarification if you find yourself in any doubtful situations.

You are encouraged to seek assistance from the instructor, from your fellow students or from anyone you think would be useful with the homework and with preparing for class discussions. You are also encouraged to work with other members of your class on these assignments, as it is often very beneficial in the learning process. However, whatever you turn in must be your own work. Simply copying someone else's work is clearly a representation of work as your own and is a case of academic dishonesty. Exams must be entirely your own work. Detailed instructions will be given on the exams themselves and discussed in advance. No collaboration of any sort is allowed once an exam begins.

Course Schedule:

There will not be a detailed course schedule for this course. In my experience, it is very difficult to stick to a course schedule in an upper-level course and these courses are much more enjoyable when there is greater flexibility in the choice of topics and the pace of coverage. As a result, the pace and content of the course will be determined as the course progresses. This means that you will have to be engaged with the course, providing feedback on what your interest are and if the pace of coverage is too fast (or slow).

Useful Advice:

You will get more out of this course if you are actively engaged. To that end, below are a few pieces of advice.

1. If you are having trouble, ask for help. There are a number of resources available to you, including the office hours that are provided by the instructor, other faculty in the department and your peers.

2. Prepare for class by reviewing your class notes between lectures and reading the relevant portions of your text before coming to class, so that you can come to class prepared to ask questions.

3. The only way to learn physics is by doing it. This means that you should read with pen in hand to work out things described only briefly in the text or lecture and work extra problems if you need feel you need additional practice. I am happy to provide additional problems, if you let me know.

4. Don't spend more than a few hours on a single homework problem. If you are stumped, show clearly where you're stumped and then ask for help.

5. Peruse the posted solution to problems.

6. Don’t get (too) frustrated if you are having trouble. Physics is hard. But, with practice and perseverance, it is all worth it.

As always, this syllabus is subject to change.