Syllabus for Physics 260 - Spring 2010

General Physics: Vibrations, Waves, Heat, Electricity, and Magnetism

Professor Fred Wellstood - Sections 301, 302, 303, 304, 305

Official Course Description: PHYS260 General Physics: Vibration, Waves, Heat, Electricity and Magnetism; (3 credits) Grade Method: REG/P-F/AUD. USP Distributive Studies Area B: Natural Sciences and Mathematics Course. Prerequisite: MATH141. Pre- or corequisite: PHYS261. Credit will be granted for only one of the following: PHYS142; PHYS260 and PHYS 261 (Formerly: PHYS262) or PHYS272. Formerly PHYS 262. Second semester of a three-semester calculus-based general physics course. Vibrations, waves, fluids; heat, kinetic theory, and thermodynamics; electrostatics, circuits, and magnetism. PHYS260 and PHYS261 must be taken in the same semester and the grade for the courses will be combined into a single grade for both. To pass, students must complete passing work in both PHYS260 and PHYS261. CORE Physical Science Lab (PL) course only when taken concurrently with PHYS 261. If purchasing used books additional software may be required.

Lecture Time: MWF.....3:00 PM - 3:50 PM
Lecture Room: Room 1412, John S. Toll Physics Building
Instructor: Professor Fred Wellstood, Office: Room 0367 Physics Building
e-mail: well@squid.umd.edu
Office Hours: Wednesday 9-10, Thursday 1-2, Friday 11-11:50, or by appointment

Teaching Assistants: TBA
Office Hours: TBA

Discussion Section #	time	room	TA
301	M.....12:00 pm-12:50 pm	PHY 0405	TBA
302	Th.....11:00 am-11:50 am	PHY 1402	TBA
303	F..... 1:00 pm- 1:50 pm	PHY 4208	TBA
304	M.....11:00 am-11:50 am	PHY 4208	TBA

Lab sections: You must enroll in Physics 261 and complete all the labs in order to pass Physics 260.

Required Textbook: The required textbook for the course is: Physics for Scientists and Engineers, A Strategic Approach, with Mastering Physics, Volumes 1, 2, 3 and 4, second edition, by Randall D. Knight (Addison Wesley). Note that we will be using material in four different volumes! You will also need a Mastering Physics access code so you can do the on-line homework. If you took 161 in the last year then you are all set - your Mastering Physics access code from 161 is good for two years. However, if you are a transfer student or for some other reason never got an access code, then you will need to get one. If you don't already have an access code from when you took Physics 161, then you have two options:

1) Purchase a used book, and purchase the Mastering Physics access code at www.masteringphysics.com for $44.50.
2) Buy textbook bundles with Mastering Physics directly from publisher at www.mypearsonstore.com - they offer a 10% discount over bookstore price, and free FedEx shipping. The charge for bundling one book with mastering Physics is only a few dollars. Only one volume needs to be bundled with Mastering Physics, the others can be bought unbundled.

The access number is needed to get on-line access to the web-based homework collection system called Mastering Physics. Also, make sure you get the second edition! If you are wondering if you really need to get the book and access number to pass the course, the answer is: Yes, you really need to get the book and access number to pass the course.

Recommended Textbooks: There are many good physics books that cover much the same material as Knight. When you are having trouble understanding something in Knight, you may find it helpful to look elsewhere. Recommended texts include:

1) Physics for Scientists and Engineers, Volumes 1 and 2, 6th Edition, by Raymond A. Serway and John W. Jewett, Jr., 6th edition, Thomson.
2) Physics by Paul A. Tipler, 3rd edition,
3) Fundamentals of Physics by David Halliday, Robert Resnick, and Jearl Walker, 7th edition, Wiley.

There are also earlier editions of these and other calculus-based physics textbooks printed in the last 20 years that contain much the same material. They often can be purchased quite inexpensively on the web or at local used book stores or found in the Engineering and Physical Sciences Library.

Grades: Your total numerical score for the course will be computed by summing your scores on the final exam, the three midterms, the homework, the lab, and the quizzes with the following weight:

Final exam	20%
Three midterm exams (8 % each)	24%
Homework (written and electronic)	24%
Physics 261 Lab	25% (if all labs completed, F otherwise)
Quizzes (lecture + discussion)	7%

A histogram of total scores for the entire class will be plotted. Assuming that the distribution is reasonably bell-shaped, letter grades will be assigned so that students with scores in the top 20% will receive an A, the next lower 40% will receive a B, the next lower 25% will receive a C, and the remaining 15% will be split between D and F.

***Important Notes**:

(1) YOU MUST BE ENROLLED AND COMPLETE ALL THE LABS IN PHYSICS 261 IN ORDER TO PASS PHYSICS 260. There are no exceptions. Students who do not complete all of the experiments in physics 261 will automatically get an F in both Physics 260 and Physics 261. Don't believe anyone who tells you differently.

(2) Phys 261 sections will meet the first week of class. You must do Experiment 0 to be eligible to do the rest of the course.

(3) You must take the Final exam in order to pass the course.

(4) No homework or exam scores will be dropped. Missing a homework assignment or exam will not be allowed without a valid documented excuse (medical problem, religious holiday, or serious family crisis). In all cases, a makeup assignment or makeup exam will need to be completed in a reasonable amount of time to get credit. The new due date and assignment must be arranged by consulting with Dr. Wellstood as soon as possible after it becomes apparent that there will be a problem. If you are going to miss an exam or assignment because of a religious holiday, it is your responsibility to inform the instructor of any intended absences for religious observances in advance, so that suitable arrangements can be made.

About the course: Physics 260 is the second semester of the three-semester 161/260/270 sequence in introductory physics intended for engineering students. You must also be enrolled in the Physics 261 lab in order to pass Physics 260. Physics 260 is a CORE physical science course with a lab. The course covers material in three main areas: Oscillations and Waves; Fluids and Heat; and Electricity through dc circuits and magnetism. This is a calculus-based sequence and makes extensive use of material in Math 140 and 141. We also will use some vector calculus, mostly line and surface integrals, but nothing too complicated. The course will stress qualitative understanding of physical phenomena as well as quantitative analysis through problem solving. If you miss a lecture, get notes from a classmate or see Dr. Wellstood. Students are responsible for all assigned material, including reading, homework and labs. Students are also responsible for material that is discussed in class but is not in the textbook.

What this means is that material from any part of the course can appear on a test, quiz or homework, whether or not it was covered in the lectures.

Exams: There are three midterm exams and one final exam. All exams will be closed book, with no crib sheets allowed, either electronic or paper. Calculators are allowed during exams, but you are not allowed to use any device with phone, photo, web, messaging or text display capabilities during an exam. You must take all the exams and no exam score will be dropped. If you cannot attend an exam at the scheduled time, see Professor Wellstood before the exam! If you miss an exam with a valid excuse, a makeup exam will be given and it is your responsibility to arrange this in a timely fashion with the instructor. Students are responsible for all material, including that covered in assigned reading, lectures and homework. Material from any part of the course can appear on a test, quiz or homework, whether or not it was covered in the lectures.

Excuses: Turning in late homework or missing an exam is not allowed without a valid documented excuse as defined by the University (medical problem, religious holiday, or serious family crisis). In all cases, a makeup assignment or makeup exam must be completed in a reasonable amount of time or you will receive a score of zero for the assignment or exam. The makeup test or assignment, and the due date, must be arranged by consulting with Dr. Wellstood as soon as possible after it becomes apparent that an exam or assignment due date will be missed. If you are going to miss an assignment because of a religious holiday, it is your responsibility to inform the instructor in advance so that suitable arrangements can be made.

Homework and Solutions: Homework will typically be assigned on Friday and due by the following Friday at the start of class. ***You must submit your answers for the homework problems over the internet using the Mastering Physics web site (see below) and in addition you must turn in any required written work showing how you arrived at your answers to the problems***.

Solutions will generally be posted on the web by midnight the following Monday after the homework is due. To get the solutions, go to www.elms.umd.edu and log in to Blackboard.

There are several advantages to electronic homework submission:

(1) You will know right away if your answer is right or wrong

(2) If you give a wrong answer, you can go back and try again to see if you can get the correct solution. You will be allowed 5 attempts for each question, so don't waste them.

(3) You are graded only on your final answers and you will know your score when you are done.

(4) The site also has a tutorial capability that you may find helpful.

Note that the software will randomize the numbers each time you make a new attempt on a problem, so be careful and remember that other students working on exactly the same problems will have other numbers! The best way to do physics problems is first to work out carefully a general solution and then plug in the numbers at the end. This is especially true if the numbers are being randomized each time so everyone has different numbers. For calculating complicated expressions, I strongly recommend using an electronic spreadsheet, such as Excel, rather than a calculator.

Why You Better Do the Homework: One of the main ways you can understand Physics is by doing the homework. Do not wait until the night before it's due to start working on your homework. The homework is supposed to be hard and it counts a lot for your grade. A sure way to get an F in this course is to not do the homework or not give your self enough time to work on it.

Why You Need to Turn in Written Solutions to the Homework: A problem with the primitive form of electronic grading that is currently available is that it can only check simple equations or numerical answers. It can't check graphs, sketches, diagrams, logical arguments, or written explanations and it can't tell you what part of your argument was incorrect. This is a very serious shortcoming because, for

many problems in engineering, the "answer" is actually the explanation, method, or argument that you used to find some number or particular result. For these reasons, you will be required to turn in **written solutions** to how you reached your answers on selected problems. Each week one or two of the problems will be chosen and the plan is to grade your work for reasoning, logic, completeness and clear explanations written in English. I should emphasize that we will only be trying to grade one or two problems each week, but you would be wise to write them all out. While I'd like to have all of your written work graded for all of the problems, there simply aren't enough resources to allow us to do that. On some occasions, you won't need to turn in written solutions. I'll let you know when this is the case.

Is it hard and time consuming to write out solutions? Yes, it can be. On the other hand, it's something you should be doing for all of your technical classes and is probably the most valuable lesson you can learn. If you aren't writing out solutions to the homework in your technical classes, then you have not been receiving adequate training as an engineer. I don't know any companies that will give you a paycheck (let alone a big one) for plugging a few numbers into a computer that then tells you that you just entered the right or wrong answer. If a computer can answer that question, then the company probably doesn't need you. Real engineers have to explain what they are doing, defend their ideas and analysis in front of other engineers and convince others (including managers who may know nothing about science, math or engineering) that they know what the heck they are doing. You need to be able to write down what you are doing and have it make sense to yourself and others. Learning how to do that does not get any easier in real life when your job, lot's of money, your company's future, or someone's life is on the line. Being a good engineer is not easy, but no one is looking to hire bad engineers.

Getting started in electronic homework submission: To turn in your homework, you need to go to:

http://www.masteringphysics.com/

The site is best accessed with a current version of Windows Explorer. If you run into problems check the system requirements. If you have not used Mastering Physics before then you should log on to the site and try the practice homework set before attempting any of the real homework sets.

Registering and Gaining Access to Mastering Physics: In order to turn in your homework, you will need to register at the Mastering Physics website http://www.masteringphysics.com/. To register, you need two things - an access number and the class ID. The access number will be packaged with new copies of the Knight text book. In other words, when you buy your textbook you need to get a new copy that comes packaged with an access number. The class ID is MPWELLSTOOD20396.

Academic honesty: I expect you to get together in small groups and discuss the problems. However, do not use these discussions as an excuse to copy someone else's solution to the homework or let someone else copy your solution. That is cheating. The right way to proceed is first to work through the problems on your own and arrive at a definite answer. With this preparation you can then discuss with others and see if you have missed something. All work you submit must be your own and should reflect your own understanding. Academic dishonesty, including copying homework, Googling for solutions on the web, or cheating on an exam, is a very serious offense which may result in suspension or expulsion from the University. Don't do it. Details on the policy can be found at

www.testudo.umd.edu/soc/dishonesty.html.

Discussion Sections: You must attend your discussion section and you must go to the section you have been assigned. Your TA will cover material (homework and exams) that may not be covered elsewhere. There will be quizzes during the discussion sections and they will count towards your grade. Please come prepared so you can ask questions, *i.e.* read the assigned chapter and work on the homework problems. Remember, the TA is there to explain things and give help when you are stuck, not to dole out answers. Also, don't forget that your TA is also a student, in this case a graduate student, and also has to take classes, do homework and teach other sections. TA's are still learning, are very busy, and

are not highly paid for all their effort. Please be respectful and understanding and expect that they treat you with the same respect and understanding.

Help with understanding the material: Physics and engineering are cumulative: the knowledge learned at each stage builds upon previous knowledge. If you find that you are falling behind, seek help early on, rather than waiting until just before an exam. Help can be obtained by:

- Attending your discussion section.
- Visiting the Slawsky Clinic, Mon. – Fri., 10-11 and 12-1, in room 1140 Physics Building.
- Going to the office hours of your instructor or TA.
- The Learning Assistance Service (2201 Schoemaker Bldg., 301-314-7693) helps students with time management, reading, note taking, and exam preparation skills.

If you find that you are having more general academic problems, or are having trouble figuring out what you want to do, I recommend that you stop by Room 1120 Physics and talk to Tom Gleason, the Physics Coordinator of Student Services. Tom graduated from Maryland and also used to be an advisor in Letters and Science (undeclared majors). He is now the advisor for physics majors, but he knows all the University rules and is a great person to talk to because of his perspective on Physics and other programs at the University.

Preliminary schedule for Physics 260
(as of January 1, 2010)

Week	Dates	Main Topics	Chapter in Knight
1	Jan. 25-27-29	Oscillatory Motion	Chap. 14
2	Feb. 1-3-5	Fluids	Chap. 15
3	Feb. 8-10-12	Wave Motion	Chap. 20
4	Feb. 15-17-19	Sound, Superposition and Standing Waves	Chap. 21
5	**Monday, Feb. 22**	**Exam I**	**Chap. 14, 15, 20, 21**
	Feb. 24-26	States of Matter	Chap. 16
6	Mar. 1-3-5	Temperature, Ideal Gasses, and Work	Chap. 16, 17
7	Mar. 8-10-12	Work, Heat & First Law of Thermodynamics	Chap. 17, 18
8	Mar. 15-19	**Spring Break**	
9	Mar. 22-24-26	Kinetic theory of Ideal Gases	Chap. 18
10	Mar. 29-31	Heat Engines and 2nd Law	Chap. 19
	Friday, April 2	**Exam II**	**Chap. 16, 17, 18, 19**
11	Apr. 5-7-9	Charge, Electric Forces, and Electric Fields	Chap. 26, 27
12	Apr. 12-14-16	Gauss's Law	Chap. 28
13	Apr. 19-21-24	Electric Potential	Chap. 29, 30
14	Apr. 26-28	Capacitance	Chap. 30
	Friday April 30	**Exam III**	**Chap. 26, 27, 28, 29, 30**
15	May 3-5-7	Current I, Voltage V, and Resistance R	Chap. 31, 32
16	May 10	dc circuits	Chap. 32
	May 11	Last day of classes	
	May 12	Exam Study Day	
	Friday May 15, 6:30 pm-8:30 pm	**Final Exam ROOM 1412 PHYSICS**	**chaps. 14-21, 26-32**