

## Syllabus for Physics 260 and Physics 260H- Fall 2014

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

Professor Fred Wellstood

**Official Course Description:** *General Physics: Vibration, Waves, Heat, Electricity and Magnetism*  
Credits: 3 DSNL (if taken with PHYS261) Prerequisite: PHYS161 and MATH141. Corequisite: PHYS261. Credit only granted for: PHYS142, (PHYS260 and PHYS261), or PHYS272. 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. If purchasing used books additional software may be required.

**Lecture Time:** TuTh 2:00pm - 3:15PM

**Lecture Room:** Room 1412, John S. Toll Physics Building

**Instructor:** Professor Fred Wellstood

Office: Room 0367 Physics Building

e-mail: [well@squid.umd.edu](mailto:well@squid.umd.edu)

Office Hours: Monday 5:30-6:30 PM, Thursday 10-11 AM, Friday 9-10 AM,  
or by appointment

### Discussion Sections and Teaching Assistants:

Section #	time	room	TA	
0301	M 12 PM - 12:50 PM	PHY 1219	Hwan Mun Kim	<a href="mailto:kim.hwanmun@gmail.com">kim.hwanmun@gmail.com</a>
0302	W 11 AM - 11:50 AM	PHY 0405	Ksenia Sosnova	<a href="mailto:ks.sosnova@gmail.com">ks.sosnova@gmail.com</a>
0303	Tu 12 PM - 12:50 PM	HBK 0105	Hwan Mun Kim	<a href="mailto:kim.hwanmun@gmail.com">kim.hwanmun@gmail.com</a>
0304	F 1 PM - 1:50 PM	PHY 1402	Ksenia Sosnova	<a href="mailto:ks.sosnova@gmail.com">ks.sosnova@gmail.com</a>
0305	Tu 1 PM - 1:50 PM	PHY 1204	Ksenia Sosnova	<a href="mailto:ks.sosnova@gmail.com">ks.sosnova@gmail.com</a>
0306	M 11 AM - 11:50 AM	PHY 1204	Ksenia Sosnova	<a href="mailto:ks.sosnova@gmail.com">ks.sosnova@gmail.com</a>
0301H (P260H)	M 12 PM - 12:50 PM	HBK 0105	Ksenia Sosnova	<a href="mailto:ks.sosnova@gmail.com">ks.sosnova@gmail.com</a>

**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, Parts 3, 4, 5 and 6, third edition, by Randall D. Knight (Pearson). You can get a version of the textbook that has all these parts, and more, covering all of Phys 161-260-270. Note that we will be using material 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](http://www.masteringphysics.com).
- 2) Buy textbook bundles with Mastering Physics directly from [www.mypearsonstore.com](http://www.mypearsonstore.com). 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 third 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:** Every year there are students who think they can get through the course without reading the textbook. The truth is there will be times when it is best to not only read a section in Knight but also read sections in other physics textbooks. Fortunately, there are many good, and at times better, 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, 6<sup>th</sup> 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 ed., Wiley.

There are also earlier editions of these and many 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) The Physics 261 Lab will not meet during the first week of classes. After the first week, unlike previous semesters you will attend lab sections every week.
- (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. The course covers material in six main areas: Oscillations, Waves, Fluids, Heat; and Electrostatics, and dc circuits. If time permits, magnetism is also covered. 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.

**The Honors Section - Physics 260 H:** Students in Physics 260 H will attend discussion section. Students in the Honors section will typically be assigned, in addition to the regular homework assignments to be completed by everyone in the class, one or two graded homework problems each week on interesting or more advanced topics.

**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 Tuesday and due by the following Tuesday 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](http://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 yourself enough time to work on it.

**Why You Need to Turn in Written Solutions to the Homework:** The primitive form of electronic grading that is currently available 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 a result. For these reasons, you will be required to turn in **written solutions** to how you reached your answers on selected problems. Typically, each week one or two of the problems will be chosen and graded for reasoning, logic, completeness and clear explanations written in English. Although we will only be grading one or two problems each week - there aren't enough TA's to grade all the problems - you should write them all out.

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, lots 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 an up-to-date browser. If you have problems check the system requirements - most common problems in the past were due to pop-up blockers, the use of out of date JAVA or an out of date browser. If you have not used Mastering Physics before then you should log on 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 class ID is MPWELLSTOOD83618. Your access number will be the same one you used last semester for Physics 161. If you do not have an access number, then you can get one pre-packaged with a new copy of the Knight textbook if you order it "with Mastering Physics" or by buying an access number at [www.mypearsonstore.com](http://www.mypearsonstore.com).

**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](http://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 August 29, 2014)**  
**Preliminary schedule of Physics 260 topics, exams, and holidays**

Week	Dates	Main Topics	Chapters in Knight
1	Tuesday Sept. 2	First day of classes	Chapt. 14
	September 2, 4	Oscillatory Motion	Chapt. 14
2	September 9-11	Fluids	Chapt. 15
3	September 16-18	Wave Motion	Chapt. 20
4	September 23-25	Sound, Superposition and Standing Waves	Chapt. 21
5	Tuesday Sept. 30	<b>Exam I</b>	<b>Chapters. 14, 15, 20, 21</b>
	Oct. 2	finish up sound and superposition	Chapt. 20-21
6	October 7-9	States of Matter, Temperature, Ideal Gasses, and Work	Chapt. 16, 17
7	October 14-16	Work, Heat & 1st Law of Thermodynamics	Chapt. 17, 18
8	October 21-23	Kinetic theory of Ideal Gases	Chapt. 18
9	October 28	Heat Engines and 2nd Law	Chapt. 19
	Thursday, Oct. 30	<b>Exam II</b>	<b>Chapters. 16, 17, 18, 19</b>
10	November 4-6	Charge, Electric Forces, and Electric Fields	Chapt. 26, 27
11	November 11-13	Gauss's Law	Chapt. 28
12	November 18-20	Electric Potential	Chapt. 29
13	Tuesday, Nov. 25	Capacitance	Chapt. 30
	<b>Nov 27-30</b>	Thanksgiving break	
14	Tuesday December 2	<b>Exam III</b>	<b>Chapters. 26, 27, 28, 29, 30</b>
	December 4	Current I, Voltage V, and Resistance R	Chapt. 31,32
15	December 9-11	I,V,R and dc circuits	Chapt. 31,32
	Friday, Dec.12	Last day of classes	
	<b>Saturday, Dec 13</b>	Exam Study Day	
16	<b>Tuesday, Dec. 16 6:30-8:30pm</b>	<b>Common Final Exam ROOM T.B.D.</b>	<b>Chapters. 14-21, 26-32</b>