



# Physics 161 - Fall 2009

## Sections: 0101, 0103, and 0104

### General Physics: Mechanics and Particle Dynamics

**Lectures:** Monday, Wednesday, and Friday 3:00 to 3:50, Room 1410 Physics

**Instructor:** [Warren Huelsnitz](#)

Office: 4222 Physics

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Office Hours: Tuesdays and Thursdays 2-4, or by appointment. Don't hesitate to email to set up an appointment if these times don't work out.

#### **Discussion Sections and Teaching Assistants:**

Section 101: Tuesday 3:00 - 3:50, Room 1402, TA: name

Section 103: Friday 10:00 - 10:50, Room 4208, TA: name

Section 104: Friday 11:00 - 11:50, Room 4208, TA: name

#### **TA Offices and Contact Information:**

name, Room ###, [xxx@umd.edu](mailto:xxx@umd.edu)

name, Room ###, [xxx@umd.edu](mailto:xxx@umd.edu)

name, Room ###, [xxx@umd.edu](mailto:xxx@umd.edu)

**Pre- or Co-requisite:** Math 141 (Calculus II). You should be comfortable with calculus before taking this class.

**Textbook:** *Physics for Scientists and Engineers, A Strategic Approach*, (Vol. 1, Second Edition), by Randall D. Knight.

**We will not use *Mastering Physics*, so don't buy it!**

**Recommended Texts.:** Knight's book is a good physics text, but there are many other books that you may find helpful, including: *Physics (Volume 1)* by Paul Tipler, *Fundamentals of Physics (Volume 1)* by Halliday and Resnick, *Feynman's Lectures on Physics (Volume 1)* by Feynman and Leighton, and *Physics for Engineers and Scientists (Volume 1)* by Ohanian and Markert.

**Clickers:** You'll need one to participate in lectures. Register it at <http://clickers.umd.edu/>.

**Course Schedule:** See last page below. It will adjust a bit as we go.

**About The Course:** The course covers material in classical Newtonian Mechanics including motion of objects in 1, 2, and 3 dimensions, Newton's laws,

work, energy, momentum, momentum conservation, rotational dynamics, and gravity. This is a calculus-based sequence and makes extensive use of material in Math 140 and 141. We will also make extensive use of vectors. We will use some vector calculus, including derivatives of vectors (to describe motion in more than one dimension) and line integrals (when we discuss work and potential energy). ***The course will stress qualitative understanding of physical phenomena as well as quantitative analysis through problem solving.***

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**Class Participation:** Lectures and discussion sections will involve your active participation, including talking with fellow students sitting nearby about questions the TA or I pose, responding to questions on behalf of your group or yourself, and, certainly, posing questions of your own. Multiple choice “Clicker” questions will be asked in class. Most questions will give you credit in the form of participation points. Your participation score will be based on your participation in lectures (primarily as indicated by the “clicker” points you have accumulated), and by your attendance and participation in the discussion sessions. Obviously it's not ok to send your clicker to class without you — that's academic dishonesty. If attending and participating in the lectures and discussion sections on a regular basis becomes a hardship, or an undue burden for you, come talk to me about it.

Read the chapter before class and reread the chapter after class. If you miss a lecture, check the syllabus and homework assignments and get notes from a classmate or see the instructor. You are responsible for everything in every covered chapter, regardless of whether the material is specifically mentioned in class. Material from the textbook may show up on homework sets or exams even if it is not specifically covered in class.

**Discussion Sessions:** In addition to regular lectures, you will be attending a one hour discussion session every week. Please check the schedule of discussion classes for your section. The purpose of this session is to discuss the material that you went over in class, solve problems (other than the ones assigned as homework), and clear up difficulties with concepts. Your teaching assistant will lead the discussion classes. Please come prepared and ask lots of questions, i.e. read the chapters, review your lecture notes, and try the homework problems before hand. But, remember, the TA is there to help you when you are stuck, not to dole out answers.

**Homework:** You are required to do the weekly problem sets, which I'll assign through [ELMS](#), (go to <https://elms.umd.edu> and log in to Blackboard). Your work must be legible and on time. Homework will typically be due at the start of class, one week after it is assigned. Solutions will be posted to ELMS after the homework is due. It is essential that you read the homework solutions and compare them with your thinking every week when they come out. Do not wait to get your homework back to read the solutions. If something doesn't make sense in the solutions, ask about it - send me e-mail, or speak to your TA.

We want you to be using the homework to build an understanding, and we'll assess it accordingly. To get full credit, you must show all your work, in addition to having the correct answer. Of course, the explanation may well be expressed in mathematics. Evidence of an effort to refine your everyday thinking, even without the correct answer, will receive at least partial credit. But, answers alone, without explanation, will receive no credit. When answering, use complete sentences. If the question is a true/false, a multiple choice, yes/no, or other similar question, explain why the answer you chose is the correct one. Points will be deducted if your handwriting is illegible, or if your answer is hard to understand because of poor grammar.

**It's important that you understand the purpose of homework in this course.** The homework problems are designed to help you develop a solid understanding of the ideas. What I hope you get out of this course isn't speed and efficiency with choosing a formula, plugging in numbers, and answering textbook problems. Rather, the goal is a strong, clear understanding of the ideas, so that you're able to come up with your own techniques for solving problems that you've never seen before.

**So don't expect to do the homework problems quickly!** If you need help, get help at the level of understanding the ideas, not at the level of someone just showing you the technique that works. Of course, that's what lots of people will assume you want, if you ask for help. They'll just show you how to solve the problem, and there you are, problem solved *without your having figured it out for yourself, and without your understanding of the underlying concepts*. If that's the kind of help you get, you probably won't do very well on the exams. The kind of help you *want* isn't focused on the most efficient technique to get the answer but on the reasoning and argumentation that leads to the answer.

**Exams:** There will be three exams during the semester (see the schedule) and one final exam. You should expect difficult exams. To get full credit, you must show all your work. You will not receive credit if you do not show your work, even if you write down the "right" answer. When answering the questions, use complete sentences. If the question is a true/false, a multiple choice, yes/no, or other similar question, explain why the answer you chose is the correct one. Points will be deducted if your handwriting is illegible, or if your answer is hard to understand because of poor grammar. 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 the instructor 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. Exams will be difficult. Memorization without understanding will not be enough. You should expect problems that make you think, not simply problems that ask you to follow recipes.

Requests for re-grading of exams must be made in writing and must specify exactly why additional credit is warranted. DO NOT write on the exam itself. No requests for changing an exam grade will be accepted more than 48 hours after an exam is returned.

**THE FINAL EXAM** is scheduled for **Tuesday, Dec 15, from 6:30pm to 8:30pm.** The schedule is at: <http://www.testudo.umd.edu/soc/exam200908.html>. Unlike most courses, Physics 161 has a “common final exam” time and you need to look at section 4 in the above link.

**Studying:** Don't skip the challenging material and problems and waste time on the easy ones. That will give you a false sense of accomplishment but will not improve your level of comprehension or proficiency. **Try to find and reconcile possible inconsistencies and confusion!** Many students make the mistake of trying to avoid confusion — confusion seems like such an awful thing that they want to stay away from it. But that makes them all the more vulnerable to it! **The best students don't avoid confusion, they look for it and try to take it on.**

**Final Grades:** No homework or exam scores will be dropped. You must take the final to pass the course. Your final grade will be computed by summing your scores on the final exam, the midterms, the homework, and participation, with the following weights:

Final exam **25%**  
Three midterm exams **30%**  
Homework **30%**  
Participation **15%**

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.

**Excuses:** If you have a valid excuse for missing an exam, quiz, or homework, see me to arrange what to do about it, beforehand if at all possible. *Ex post facto* (after the fact) excuses will require validation and may not be acceptable. And you *must* speak to *me*. Your TA does not have the authority to excuse you from any requirement. 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 the instructor 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. There will be no make-up exam unless prior arrangement is made with the instructor.

**Academic Honesty:** I expect you to get together in small groups and discuss the material and the homework 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, such as copying homework, cheating on an exam, or having someone else use your clicker, 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).

**Help Available:** It is very important not to fall behind in this class, since each chapter builds on all previous chapters! If you have any difficulty at all understanding the material, please clear it up as soon as possible. If a difficulty is not cleared up right away, it will lead to more trouble later on. So, let me repeat again, clear up your difficulties as soon as they arise without any delay. THIS IS VERY IMPORTANT!! Please take advantage of my office hours which are given above. If you cannot come during the scheduled office hours, I will also be available at other times; send me an e-mail the day before to set up an appointment ([whuelsnitz@icecube.umd.edu](mailto:whuelsnitz@icecube.umd.edu)).

You can also use a free tutoring service in the Physics Department: the Slawsky Clinic. It is run by a group of retired physicists. It is located in Room 1214 in the Physics building. The time reserved for PHYS161 is Mon-Fri 11-12, and 2-3. However, you can usually get help at any time they are open, from 10 AM until 3 PM. See <http://www.physics.umd.edu/academics/ugrad/slawsky.html>.

If you find that you are having more general academic problems, or are having trouble figuring out what you want to do, I'd 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 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.

**Schedule for Physics 161**  
**Sections 0101, 0103, and 0104**  
**Fall 2009**

<b>Lecture #</b>	<b>Dates</b>	<b>Chapter in Knight</b>
1,2	31 Aug, 2 Sep	1 - Concepts of Motion
3	4 Sep	2 - Kinematics in One Dimension
-	7 Sep	Labor Day – no class
4	9 Sep	2 - Kinematics in One Dimension
5,6	11, 14 Sep	3 - Vectors and Coordinate Systems
7-9	16, 18, 21 Sep	4 - Kinematics in Two Dimensions
10-12	23, 25, 28 Sep	5 - Force and Motion
13	30 Sep	6 - Dynamics I: Motion Along a Line
14	2-Oct	<b>Exam I (Ch. 1-5)</b>
15,16	5, 7 Oct	6 - Dynamics I: Motion Along a Line
17-19	9, 12, 14 Oct	7 - Newton's Third Law
20-24	16, 19, 21, 23, 26 Oct	8 - Dynamics II: Motion in a Plane
25	28 Oct	9 - Impulse and Momentum
26	30 Oct	<b>Exam II (Ch. 6-8)</b>
27-29	2, 4, 6 Nov	9 - Impulse and Momentum
30-32	9, 11, 13 Nov	10 - Energy
33-35	16, 18, 20 Nov	11 - Work
36,37	23, 25 Nov	12 - Rotation of a Rigid Body
-	27 Nov	Thanksgiving – no class
38	30 Nov	<b>Exam III (Ch. 9-12)</b>
39,40	2, 4 Dec	12 - Rotation of a Rigid Body
41-43	7, 9, 11 Dec	13 - Gravity
	15 Dec	<b>Final Exam (Ch. 1-13)</b>