Physics 113 – General Physics/Mechanics - under construction
Fall term 2008, University of Rochester - version 2.3 Aug. 23, 2008
Information, Syllabus, and Schedule

Physics 113 is a calculus based physics survey course designed for science majors who are not majoring in physics or engineering.

The topics of vectors, linear and multi-dimensional motion, work, energy, gravitation, simple harmonic motion, conservation of momentum and energy, constant acceleration motion, rotational motion, waves, and thermodynamics will be covered at an introductory university level.

Students are assumed to have knowledge of calculus, and be familiar with derivatives and integrals. No previous physics instruction is assumed.

Course instructor:
Prof. Arie Bodek   Teaching E-mail address: ariebodek@gmail.com
   Phone: 275-5445
   Office: B&L-354
Office hours: Tuesday 2-3:30 after class *or by appointment.*   With my travel and your variable needs/schedules fixed office hours are not terribly practical.   If I am out of town or one of the Tuesday time slots does not work for you, speak to me or send e-mail to find a mutually suitable time. TA office hours are TBA and will be found posted on the class website.

Course web site:
Extensive use will be made of the web (Blackboard) for distributing course materials, making announcements, etc.
http://www.rochester.edu/it/myrochester/support.html
The Lab web site is : http://web.pas.rochester.edu/~physlabs/
If you have problems reaching this site (and you've verified it is not your problem), please contact me.

Blackboard:
I will be using Blackboard in this course. e.g posting homework assignments and notes, and reporting grades to you. You can log into, and learn more about, Blackboard at http://www.rochester.edu/it/myrochester/support.html

Course e-mail: My Teaching Email is ariebodek@gmail.gov
For lab issues: Email (physlabs@pas.rochester.edu)
I will set up a course e-mail distribution list. Time-critical announcements, hints for problem sets, corrections for problem sets, exam location changes, etc. will be sent to you via e-mail. *It is essential that you be on this list if you are in the course.* In such a large course, communication is a HUGE issue. Consequently, I will make redundant announcements (via email and class and website) and I will make liberal use of email. I apologize in advance if you feel "spammed" by me from time to time, but it is necessary to keep things running smoothly.

Lectures:
Hoyt Hall, Tuesday/Thursday 1230-1345

Textbook:
    Douglas Giancoli, **Physics for Scientists and Engineers**, Volume 1, 4th edition
        (2008), Prentice-Hall. **You may use an older version if you have it already**
    Please note that if you are buying a version of the text that will cover P114 material
        as well, be sure to get the version that includes modern physics.

Books on reserve in Physics and Astronomy (PAS) library:
    Douglas Giancoli, **Physics for Scientists and Engineers**
    Halliday, Resnick and Walker (HRW) **Fundamentals of Physics** (for use as an
        alternative textbook with different order and explanations).
    Tipler, **Physics**
    Young and Freedman, **University Physics**

Philosophy and goals: I have two major goals in this course as far as each of you is concerned. One goal is to provide you with a basic survey of the principles of mechanics and an appreciation of the importance of these principles to your world. The other goal is to develop in you the ability and confidence to attack analytical problems. (Note: I did NOT say memorize equations!)

    Unfortunately, I cannot open your skull and shove this knowledge/ability in your head. I will provide a systematic program of study and assignments at the appropriate level for this course. I have chosen a textbook at the appropriate level for this course. I will give lectures that I think are relevant and useful and even entertaining in spots (have mercy, it's physics after all). I will provide a support system manned by well-trained graduate and undergraduate teaching assistants. *THE REST IS UP TO YOU!* I will treat you as professional, adult students. I expect you to treat the course accordingly.

    Plug-and-chuggers beware! I rarely give a problem on an exam that is exactly like something you have seen. I will give some problems that are very similar to what you have seen in order to check for basic brain activity. However, I am much more interested in testing your understanding of the concepts/techniques and your ability to use them when facing uncharted territory. Often my exam problems are almost trivial if you understand the concepts and quite difficult if you don't. Typically, they are not hard technically (I'm not testing your ability to do math). We do give substantial partial credit for good attempts. Often the mean on my exams is around 65/100. If the class and the exam are "normal", the mean is roughly a B. In the past, some students have found the low numerical means somewhat frustrating. Though I do not wish frustration on any of you, I find the low mean comes about naturally if I give exams that allow me to evaluate students at the upper end of the curve as well as those at the lower end. Since I must evaluate all the students in the course, we are forced into exams that yield lower means.

    Be aware that you'll benefit from working to understand the concepts behind the problems. If you spend time plugging numbers into whatever equation seems to work without putting much thought as to why that is the correct equation … well, you won't enjoy the exams very much. Honestly, there is no shortcut in this business. The most

efficient way to get through this course is to relax and work to understand the concepts and problem solving techniques.

Recitations/workshop: Recitations and workshops will be conducted by your Teaching Assistants. Information on recitations will be posted on **Blackboard**

Laboratory: http://web.pas.rochester.edu/~physlabs/ Currently, the laboratory is conducted independent of lecture.   However, the lab grade contributes to your final course grade. **You must do (and hand in)** *all the labs* **get a grade for this course.** The laboratory grade will be averaged into the course grade. All questions regarding the laboratory should be sent to the laboratory e-mail address (physlabs@pas.rochester.edu) or addressed to Professor McFarland. The physlabs e-mail address is appropriate for the majority of your questions, and is more likely to yield a timely response. **Labs start Sept. 8, 2008.** *We will use 9/5/08 (F) 3:25 pm for a one time Statistics Lab lecture*.

Problem sets: Your solutions to each week's problem set must be deposited in the TA mailboxes by **1 pm on Sunday** (this will allow TA's to grade homework for Monday's recitation). The TA mailboxes are located in lockers located in the Bausch and Lomb Physics Department building, on the first floor- between the machine shop Room BL104 and the entrance to the tunnels. The B&L building should be open after 12:00 noon (since this is when the physics library is open). If the building is locked, call security at 5-3333.

I will ask you to do a set of problems each week that illustrate and/or enhance what we've discussed in the lecture. This is a quantitative, problem-driven course. I will work mostly on concepts and mathematical techniques in lecture … but the exams will consist of quantitative problems. It is absolutely *critical* to your survival in this course that you work on these problems each week! *For the vast majority of students, it is not possible to do well in this course without struggling with most of the homework problems throughout the semester.*

A week after each problem set is assigned, I will release a solution set. Your job is to study these solutions, understand your mistakes, and correct any misperceptions or holes in your understanding.

You are encouraged to discuss the problems with others both before and after you turn in your assignment. However, I urge you to struggle with each problem on your own first. Otherwise your colleagues will carry you and you won't get much out of it. Most of you will find it easy to follow someone else's work. If you follow others too much, as you do the problem sets you will find that you are unable to begin problems on your own.
A fraction of your grade comes from your solutions to the problem sets. Only a few problem, chosen at random, will be graded each week. It is not necessary to have the correct solution to the selected problem in order to get partial credit. You must, however, have made an honest attempt to do the problem. I reserve the right to switch the system from grading a single problem to making a "scan for effort" throughout the problem set

or full careful grading of the whole set.

Your solutions to each week's problem set must be deposited in the TA mailboxes by 1 pm on Sunday (this will allow TA's to grade homework for Monday's recitation). We will usually release of the official class solutions the following day 5 pm Monday. Solutions handed in late will not be accepted. In case that didn't sink in, let me say it again. ***Solutions handed in late will not be accepted. You should do any problem sets you fail to hand in anyway or your exam grades will suffer and THAT will affect your final grade.*** *The lowest homework grades for two problems sets will not be counted for your grade.* ***If you have a valid reason for missing more than two homework sets (e.g. Doctor's note), let me know.***

The point of forcing you to turn in the problem sets is to promote the habit of keeping up with the course. ***Physics does not cram easily***. Many concepts/techniques need time to gel.

Personal response system: We may use a personal response system (PRS) during lecture this semester. You will need to purchase a PRS transmitter at the bookstore (something like a small remote control). If you still have the one you used in a previous class, it will work for our class. Bring it to lecture regularly once we start using it. This is a tool that will enable me to get responses from you in real time during lecture. It helps me make the lectures more interactive and engaging (which is tough to do in an analytical course like physics). The use of the PRS device is a requirement in this course. It improves the experience for everyone. I reserve the right to allocate 1% of your final numerical average to PRS usage if too few of you are bringing the PRS devices to class. 1% may not sound like much, but it can be a big deal in the end. I will warn you if I feel that this is necessary.

Where's the prof?: You are my priority. However, my research duties will force me to travel some this term. I will do all I can to schedule my travel so that it has a minimal impact on your class. However, I won't be able to completely avoid it. Class will go on. I'll do my best to arrange a decent guest lecturer or record a video of the lecture and stream it for you or arrange for you to view it with someone present to answer questions. The option I choose will depend on the nature of my trip and your preferences. I will usually be in e-mail contact when out of town.

Makeups/missing exams and problem sets: If you miss the final exam for this course you will have to take an incomplete in the course and *take the final exam in December of next year* in order to complete the course.

If you miss one of the term exams *for any reason* (no matter how good or frivolous), that exam will count as your "drop". I do not need to hear about it. If a good reason is forcing you to miss two exams, contact me and an ORAL MAKEUP will be scheduled.

I have provided flexibility in the structure of the course to allow you to miss one exam and a reasonable fraction (two) of the problem sets with no penalty. Use this flexibility sparingly and in times of real need because I will not negotiate for additional flexibility. Bear in mind that a big motivation of the problem sets is to keep you from falling behind in the course. To allow you to skip or do these assignments late defeats their purpose.

Lab lectures: Short lab lectures will be delivered by TA's at the start of each lab. In addition, *there will be one common lab lecture on Statistics at 3:25-4:20 pm in Hubble Auditorium, Friday Sept. 5, 2008*

Grades:

Exam grades are expected to have class mean of each exam is 70. *The lowest exam grade (or a missed exam) will be dropped (this is why we have four exams)*. Your grade will be calculated via one of the four schemes shown in the table below, taking the one that yields the highest average. The numbers represent the relative contribution of the item in that column to your final numerical grade.

Scheme	Exam 1	Exam 2	Exam 3 midterm	Exam 4	Lab	Prob sets	Final exam
Chapt Lect	Chpt 1-5	Chpt 6-9	Chpt 1-13	Chpt 14-16	4 labs	13 HW	Chpt 1-20
1	---	16%	16%	16%	10%	12%	30%
2	16%	---	16%	16%	10%	12%	30%
3	16%	16%	---	16%	10%	12%	30%
4	16%	16%	16%	-	10%	12%	30%

You will not receive a grade in the course *until you have completed the required laboratory work.*

Your initial relative position on the grading curve depends solely on the numerical grade as calculated above. I will then assign letter grades to the numerical scale. There is no fixed curve to be assigned … no grade quotas. If you all do "A" work in my eyes, you ALL get A's and I get to deal with the dean and the chairman of the department … but so be it. It's a problem I would love to have!

If you are close to (but below) a grade boundary (within one point as the rounding is done to the nearest integer by my Excel spreadsheet) … and many of you will be … I will give you the higher grade near the boundary if you have attended lectures and recitations on a regular basis.

If you are at the bottom of the curve, it does not necessarily mean you are failing the course. It means I have to look very carefully at your scores and effort. If you are living on bits of partial credit and are putting in little visible effort, then you may not pass the course. If you are making more mistakes than you should, but are putting in effort and show that you are learning something by taking a pretty good crack at a number of problems through the semester, then you will pass … you

may not be in any danger of an A, but you'll get through the course.

Schedule: Fall 2008: **This course schedule is *approximate.*** The exam dates are fixed.
Exam subject matter will change as appropriate for the material covered. Some of the
Physics Common time (8:00-9:30 am Hubble) dates will be used. For this course in
addition to *one in class exam,* and for the other exams we will use common exam times:
10/7, **10/30, 12/9** . *We will use 9/5/08 (F) 3:25 pm for a one time Statistics Lab lecture.*

Lecture	Date 2008	Topic Homework due Sunday 1 pm end of each week	Chapter in Giancoli	HW set	Wkshp module
1	Sept 2,08 (12:30 Tu)	Organizational stuff, units, motion, velocity (errors, Statistics)	1 + **Lab website**	1	0 do on your own Sept 1-week
Lab lect	Sept 5,08 (3:25 F)	**Statistics 3:25-4:20 pm - Hubble**	Appendix A	Lab Manual	0 do on your own
2	Sept 4,08 (12:30 R)	Motion, velocity, acceleration in 1 D	2	1	0 do on your own
3	Sept 9,08 (12:30 Tu)	Freely falling objects, vectors	2	2	Wkshp 1 Sept 7-week
4	Sept 11,08 (12:30 R)	Motion in a plane, projectile motion	3	2	Wkshp 1
5	Sept 16,08 (12:30 Tu)	Circular motion, Newton's first law	4,5	3	Wkshp 2 Sept 15-week
6	Sept 18,08 (12:30 R)	Newton's 2nd and 3rd law, friction	4,5	3	Wkshp 2
7	Sept 23,08 (12:30 Tu)	Friction	5	4	Wkshp 3 Sept 23-week
8	Sept 25,08 (12:30 R)	Gravity, potential energy	6	4	Wkshp 3
9	Sept 30,08 (12:30 Tu)	Planetary motion, Kepler's laws	6	5	Wkshp 4 Sept 29-week

10	Oct 2,08 (12:30 R)	Work and Energy, constant and variable force	7	5	Wkshp 4
Exam I	**Oct 7,08 (8 am Tu)**	**Hubble 8:00-9:30 AM covers lectures 1-7**	**Chapter 1-5**	**PS 1-4**	
11	Oct 7,08 (12:30 Tu)	Kinetic and potential energy, conservation of E	8	6	Wkshp 5 Oct 6-week
12	Oct 9,08 (12:30 R)	Conservative and non conservative forces	8	6	Wkshp 5
13	Oct 14 (12:30 Tu)	Center of mass, momentum	9	7	Wkshp 6 Oct 13 week
14	Oct 16 (12:30 R)	Conservation of momentum, 1D collisions	9	7	Wkshp 6
15	Oct 21,08 (12:30 Tu)	Collisions in 2 dimensions	9,10	8	Wkshp 7 Oct. 20 week
16	Oct 23,08 (12:30 R)	Rotational motion	10	8	Wkshp 7
17	Oct 28,08 (12:30 Tu)	Angular momentum, Torque, moment of Inertial	11	9	Wkshp 8 Oct 27 week
Exam II	**Oct 30,08 (8 am R)**	**0800-0930 (Hubbell Auditorium) lecture 1-16**	**Chapter 6-9**		
18	Oct. 30,08 (12:30 R)	Conservation of angular momentum	12	9	Wkshp 8
19	Nov 4,08 (12:30 Tu)	Fluid mechanics	13	10	Wkshp 9 Oct 29 week
20	Nov 6,08 (12:30 R)	Equilibrium, harmonic motion	12,14	10	Wkshp 9
Review	Nov 11,08 (12:30 Tu)	**Review for exam 3 - midterm**	**Chapt 1-13**		Wkshp 10 Nov. 10 week
Exam III	Nov 13,08 (12:30 R)	**12:30-1:45 (Hoyt Auditorium)**	**Chapt 1-13**		Wkshp 10

21	Nov 18,08 (12:30 Tu)	Harmonic motion, damped motion	14	11	Wkshp 11 Nov 17 week
22	Nov 20,08 (12:30 R)	Waves	15	11	Wkshp 11
23	Nov 25,08 (12:30 Tu)	Waves, sound and music	16	11 Due Wed. Nov 24	No workshops
holiday	**Nov 27,08 (12:30 R)**	**Thanksgiving …no class (give thanks!)**	**---**		**No wokshops**
24	Dec 2, 08 (12:30 Tu)	Temperature, Heat	17	12	Wkshp 12 Dec 1 week
25	Dec 4,08 (12:30 R)	Kinetic Theory of gases	18	12 last one graded	Wkshp 12
Exam IV	Dec 9,08 (12:30 Tu	**0800-0930 (Hubbell Auditorium**	**Chapter 14-16**	-	
26	Dec 9,08 (12:30 Tu)	Heat and first law of thermodynamics	19	13	Wkshp 13 Dec 7 week
27	Dec 11,08 (12:30 R)	Thermodynamics Last day classes	19,20	13 not graded	Wkshp 13
Final Ex.	Dec 17,08	***Mon 7:15pm***	**Cum.**	**1-20**	