Physics 102

Introduction

Welcome to Physics 102, the class for those of us with a math phobia. Have you ever wondered why a free throw follows an arc during a Lobo basketball game? Or why in Albuquerque your pasta still seems underdone after cooking it for the recommended time on the box? Or if black holes really exist? If so, this is the class for you. Maybe you've considered these things but thought that taking a class about them was out of the question since surely the answers to your ponderings must be a confusing mess of equations filled with arcane symbols, not something you wished to study on Tuesday and Thursday nights (or any other night of the week). If so, this class is definitely for you. I hope that during our time together I can convince you that physics, the ultimate study of why things happen, can be explained to everyone using simple words and concepts that minimize the use of mathematical hocus-pocus.

Of course, nothing in life is free, knowledge included. Most people will find it necessary to do a fair bit of work to keep up with this class. I can only do so much to cram these concepts into your brain, the rest is up to you. If you are willing to really think about what you are reading, to do the homework, and most importantly to let me know when you're still not getting something, then I'm sure we can have a very successful class for everyone.

General information

Physics 102, section 02, "Introduction to Physics", Call number 15556, Cr 03, TR 5:30-6:45 in Regener 103. Your instructor is Mark Morgan-Tracy (though I often drop the Morgan and use the simpler Mark Tracy moniker). My office is located in Room 17 in the Physics and Astronomy building. Please note that this building is located on the corner of Yale and Lomas, nowhere near Regener hall. My email address is `mtracy@phys.unm.edu` and is the best way to reach me. The required text is the ninth edition of *Conceptual Physics* by Paul G. Hewitt.

Office Hours

I will hold office hours on Tuesdays and Thursdays from 4:00 to 5:00 pm in my office. I realize that these times may be inconvenient to those students who have day jobs or a class preceding this one, and I encourage you to contact me to set up an appointment at a different time if you have questions or problems. You can reach me by email or by calling the Physics and Astronomy main desk at 277-2616 and leaving a message. I will try my best to accommodate your schedule.

Course grade

Your grade for this course will be determined by the combination of exams and homework scores. There will be three exams held during the semester. Their dates are Feb. 20, Apr. 3, and May 8. Each exam will determine 25% of your grade. The third exam will be held on the last day of class. There will be no comprehensive final exam in this class. Exam scores may be curved depending on class performance. Exams will be inspired by the homework problems and lectures and will consist of somewhere around 30 multiple choice questions with one or two of the dreaded "word" problems. Please remember to bring a pencil with you to fill in the answer sheet.

The final 25% of your grade will be determined by homework. We will be using webassign for grading the homework. There is a rather lengthy introduction to webassign below, so if this last statement is gibberish to you please don't be discouraged yet. Each week, I will be assigning somewhere around 5 problems. **Homework assignments are due the following Tuesday at midnight!!** The purpose of the homework is to make sure that you are keeping pace with the class and understanding the topics being discussed. Even though we are using web-based homework collection, I highly recommend working the problems out on paper first before entering your answers on the computer. This will not only help you think through the problems, but will also leave you with a valuable study tool come exam time.

After averaging the three exams and homework, your final grade will be determined by the following scale,

A+	$98 - 100$	A	$93 - 97$	A-	$90 - 92$
B+	$87 - 89$	B	$83 - 86$	B-	$80 - 82$
C+	$77 - 79$	C	$72 - 76$	C-	$70 - 71$
D+	$67 - 69$	D	$63 - 66$	D-	$60 - 62$
F	below 60.				

Finding grades, lecture notes, and homework solutions

I have set up a "webct" account for this class. Not sure what this is? Neither was I until just recently. UNM has a service where we can set up a web page for a class. You can find our class at the `http://webct.unm.edu` website. **You must have an account at CIRT to access this web page!** To get a CIRT account please go to `http://cirt.unm.edu/accts/index.html` and fill in the necessary information. At the webct site, you'll find a copy of this syllabus, down-loadable lecture notes and homework solutions, and even your grades. You will need the Adobe Acrobat reader to view lecture notes and homework solutions. If you have any questions about your grades (or just want to talk to me about problems you're having), you can always email me or come see me at office hours or before class. If you notice any errors in your grades, please contact me as quickly as possible so we can rectify the situation.

Lecture attendance

I am not your father and certainly not your mother, and as such, I will not guilt you into attending lectures. You are all adults. If you are not in class, I will assume there is a legitimate reason for your absence. However, I must stress that I have chosen both the homework and exam questions directly from my lecture notes. It will make your life much easier for you to attend class. Moreover, we will be covering some topics in class that are not found in the book. I promise to give advance warning of such lectures and copies of my notes will be available on our website.

When in class, please feel free to interrupt me if you have questions. I know that we have a big class, but if I say or do something that you don't understand then most likely other students aren't getting it either. If calling

attention to yourself in this manner is not appealing, then please email or come see me at office hours with your questions.

Course Content

We have only one semester to cover a lot of material. Physics is a very diverse field. Necessarily, some parts of the book will be covered in more detail than others. We will be spending a lot of time (a third of the semester) on chapters 2 through 10. This is the core of classical mechanics, *i.e.* how and why things move (very useful if you want to understand driving a car or throwing a ball). The next couple of sections of Hewitt's book are going to get the axe pretty much. We'll try to cover the highlights of matter, heat, sound, and electricity, but won't be covering them in as much detail. Finally, as I figure that the ends of books are usually the most exciting, we'll slow back down and spend the final third of the semester covering the really good stuff in the last ten chapters: quantum mechanics, and special and general relativity. It's these topics that really excite physicists. I hope by the end of this course, they'll excite you as well.

Calendar (tentative)

Here's a tentative schedule for the class along with reading assignments and important dates. I know it doesn't look that exciting, but we'll try to liven it up a bit in class.

Date	Topic	Reading Assignment
Jan. 23	Inertia	Chapter 2
Jan. 28	Linear motion and Newton's second law	Chapters 3 and 4
Jan. 30	Newton's third law	Chapter 5
Feb. 4	Momentum	Chapter 6
Feb. 6	Energy	Chapter 7
Feb. 11	Rotation motion	Chapter 8
Feb. 13	Projectile motion (we'll save gravity for later)	Chapter 10
Feb. 18	A brief intro to physical chemistry	Chapter 11*
Feb. 20	**Exam one**	Please review for the exam!
Feb. 25	The four states of matter	Chapters 12 through 14
Feb. 27	Heat and how it flows	Chapters 15 and 16
Feb. 28	**Last day to drop without a grade!**	
Mar. 4	Phase changes	Chapter 17
Mar. 6	Waves	Chapter 19
Mar. 11	Sound	Chapters 20 and 21
Mar. 13	Electrostatics	Chapter 22
Mar. 18 and 20	Spring break	No reading necessary
Mar. 25	Electric current	Chapter 23
Mar. 27	Magnetism and induction	Chapters 24 and 25
Apr. 1	How your computer works	**Non-book lecture**
Apr. 3	**Exam two**	Please review!
Apr. 8	Light and color	Chapters 26 and 27
Apr. 10	Reflection and refraction	Chapter 28
Apr. 15	Light waves and emission	Chapters 29 and 30
Apr. 17	Light quantum	Chapter 31
Apr. 18	**Last day to withdraw with WP grade**	
Apr. 22	Quantum mechanics	Chapter 32*
Apr. 24	Radioactivity, fission, and fusion	Chapters 33 and 34
Apr. 29	Special relativity	Chapter 35
May 1	Gravity and other astronomy topics	Chapter 9*
May 6	General relativity	Chapter 36
May 8	**Exam three**	Exam review!
	* indicates possible non-book material	

Webassign

For this class, we will be using an on-line homework collecting tool called webassign. This allows me to assign homework to you in class, you go and

fill in the answers, and it automatically grades your homework, gives you instant feedback about what's right, and sends the grades off to me.

I have set up everyone who is already registered with an account. To log in, you need to go to the following website `http://webassign.net/student.html` and have your login name, our institution (UNM), and password ready. If it was available, I have used your CIRT login name. Otherwise, I have set up your login name to be your first initial and full last name. So if I'm going by my more casual Mark Tracy name, my login name would be mtracy. For right now everybody's password has been set to "junk0" (that's the word junk with a zero at the end). Everyone should quickly change their password to something a bit less repeated. Hopefully, after logging in the rest should be straightforward. If you have any questions, please contact me immediately.

There is one unfortunate catch. There is a small student fee involved with using webassign. There are two methods of payment available. One is that you can use a credit card and pay the fee yourself. The other is to pay me the fee, so that I can give you a "lottery ticket" with an access code. This code tells webassign that you have paid your fee. For some bizarre reason the fee is 8.50 if you pay on-line and only 6.50 if you pay me. So I recommend paying me, but it's your two dollars.

Homework assignments

Here's a partial list of homework assignments along with due dates. I have chosen to stick with Hewitt's "Exercises" instead of his "Problems" to facilitate our math-avoidance class philosophy. Please remember that all assignments must be completed on the webassign website before midnight of the due date. I'll be providing a list with the homework for the rest of the semester later (when I actually figure out which problems you should do).

Due Date	**Problems**
$1-28$	**Ch** 2-Ex. 7, 17.
$2-4$	**Ch** 3-Ex. 4, 24, **Ch** 4-Ex. 10, 37, **Ch** 5-Ex. 8, 13.
$2-11$	**Ch** 6-Ex. 14, 48, **Ch** 7-Ex. 13, 36, 42.
$2-18$	**Ch** 8-Ex. 3, 50, **Ch** 10-Ex. 8, 10, 38.
$3-4$	**Ch** 11-Ex. 16, 26, **Ch** 13-Ex. 27, **Ch** 14-Ex. 10, **Ch** 15-Ex. 12, **Ch** 16-Ex. 16.
$3-11$	**Ch** 17-Ex. 31, 46, **Ch** 19-Ex. 10, 21, 25.