PHYS-101-110 Mechanics, Heat, and Sound Lab
Thurs. 3-5

About the TA

My name is Matt DeCross; I'm a first year graduate student in physics studying topics in quantum gravity and quantum field theory. I did my undergraduate in physics and math (and philosophy!) at MIT. I do physics because I think black holes are awesome and I want to know what's inside them.

If you need to contact me for any reason throughout the course, I try to answer my email fairly promptly: *mdecross@sas.upenn.edu*. Feel free to shoot me a message with a logistical or technical question about the pre-lab or upcoming lab; if you want to chat about life, the universe, and everything; or if you want to know why black holes are awesome.

What You Should Strive to Get Out of Lab

Most of you will not continue on to careers in physics. However, this lab course still can teach you knowledge and skills that will be useful to you in your future careers. The below is a short, very incomplete list of things that you can keep in mind while doing labs that will serve you well later in any scientific (or even non-scientific!) career. In no particular order, some of the major takeaways that I thought of last night at 1AM are:

- If your results are not consistent with what you would have guessed beforehand, there's a reason why.

- An unlabeled graph is a useless graph for other people.

- The number of significant figures reported in some quantity usually tells you about the precision of the tools that measured it.

- "Human error" is mostly not a thing in the real world. Thinking hard about the actual sources of error can lead to insights.

- Many of the most famous physicists are those who are not only brilliant but also express their ideas and results with clarity.

- Don't be that biologist who publishes an original paper rederiving the trapezoid rule for estimating integrals (this is an actual paper with hundreds of citations: see *http://care.diabetesjournals.org/content /17/2/152.abstract*). Your math and physics classes might be handier one day than you expect...

Lab Schedule and Details

The schedule for the semester consists of ten lab sessions and one make-up session at the end if necessary. You can find the calendar on the Canvas page or at *https://www.physics.upenn.edu/undergraduate/undergraduate-physics-labs/lab-schedule/physics-101*, although it is also reproduced below:

Sept 15	1-D Motion	Nov 3	Rolling Motion
Sept 22	Projectile Motion	Nov 10	Harmonic Motion
Sept 29	Newton's Laws	Nov 17	Standing Waves
Oct 13	Friction	Dec 1	Buoyancy
Oct 20	Data Analysis	Dec 8	Make-Up Lab
Oct 27	Springs		

In order to complete most lab assignments you will need LoggerPro, which is a data manipulation program that can interface nicely with the sonar sensors and video cameras that we will use throughout the course.

The link to download the software (if you want to work on your own personal computer), as well as other useful materials, can be found at *https://www.physics.upenn.edu/undergraduate/undergraduate-physics-labs*.

Grading and Attendance Policies

Pre-lab assignments are due on Canvas at midnight at the end of the day two days before each lab session. They're graded on completion, not correctness; however, I reserve the right to require resubmission if the work has not been completed satisfactorily. If you do not complete the pre-lab assignment, you cannot (per course policy) receive above a 6/10 on the lab, which counts as a "Needs Improvement." If you receive three Needs Improvements, the third becomes a fail. I strongly encourage you to type pre-lab assignments and computer-generate plots, but will not require it.

Your lab questions must be completed and turned in by one representative of your group via Canvas at the end of each two-hour lab session. Lab questions *must be typed* and plots must be *computer-generated*; however, any document format is acceptable. Late submissions will not be accepted except at my discretion. Grades will be uniform across all members of a lab group.

Per school policy, if you are more than half an hour late to a lab session, it will count as an absence and that lab will be automatically failed. If there is some extenuating circumstance that will prevent you from attending a lab session please communicate this to me as soon as you are aware of it.

If you receive a Needs Improvement on three labs, or if you fail a lab, that lab can be made up at the extra session that occurs at the end of the semester. You must pass all labs in order to pass the course!