

Physics 211 TA manual

Welcome to the Physics 211 teaching team! This document will serve both as an introduction to your duties and as a reference during the semester.

This is possibly the most important TA assignment in the whole department. About sixty students in your recitation sections will be exploring physics for the first time, and you will be the most valuable guide that they will have. This class is a large undertaking: we have five hundred students and a teaching team of more than thirty people, all working toward a common purpose: helping five hundred new students gain both physics skills and an appreciation for the beauty of our field. We want them to leave our class knowing the basics of Newtonian mechanics – but also thinking that physicists are friendly people and that physics is a field they can succeed in and that welcomes them.

Collegiality and Your Roles

We'll all be working closely together this semester (professors, TA's, coaches, and students), and it's vitally important that we do this in a supportive, collegial, positive way. If you have any suggestions for how we can improve things, please let me know. Also, if you need help or support of any kind – someone to cover your class while you're sick or while you study for a hard exam, advice for any issues that arise – please ask.

I see GTA's as *junior professional instructors*, not as minions. You all will have your own ideas about how best to run things in your own recitations. That's fantastic: as teaching professionals in your own right, you *should* have your own ideas and act on them. If you want to “get off script” – if you see a need to do something different than we've planned in order to best help your students learn – please feel free to do it. (Let us know afterwards, of course!) Any input or feedback you have on our course is extremely valuable.

In our class, you will have a few main duties:

- Lead recitation sections
- Collaborate with the teaching team in weekly staff meetings
- Supervise coaches
- Grade homework assignments
- Proctor and grade exams
- Grade papers

I'll discuss each of these in detail at the end.

Interacting With Students

(This section partially based on insights from Prof. Jenny Ross.)

- College can be a challenging time: many of our students are away from home for the first time, and many of them are at the age where psychological problems like depression and anxiety naturally manifest. If you notice any of our students showing signs of emotional distress, or

disengaging from class (not attending, showing up but not working), please let Matt, Walter, or Merrill know. We'll contact the student and see what kind of support they need.

- Many students see coursework as a minefield of “wrong answers” through which they must walk in order to find the elusive “right answer”. This mentality is **not helpful**, and leads to students associating error with failure. We all know this isn't the case, but we need to be vigilant to make sure we're not perpetuating this mindset that some students have. Thus, when you're interacting with students:
 - Let the student know that you think they can succeed. (They almost certainly can!)
 - Instead of focusing on things they did wrong, find the kernels of physical insight that they *do* have and build from there.
 - It's better to observe them working in their groups and point out mistakes at that point – physics is a process, not a set of answers, and we can help them learn best if we can diagnose their misconceptions from that process rather than only the finished product.
 - On homework, when possible, give them insight into the nature of their errors. Remember: **errors do not mean the student is a failure** – they just give us insight on what the student has yet to learn.
- **Harassment, exclusion, bullying, and the like are not acceptable in our class.** Physics has a place for everyone, regardless of who they are or where they come from. If you see any dynamics that act to exclude certain students from feeling welcome – including pathological group dynamics where one person railroads everyone else, or one person doesn't have a chance to contribute – please intervene if you can and/or contact Matt, Walter, or Merrill.

Dealing With Emergencies

If you are going to miss a recitation section and have advance warning, swap with another TA; that's not a problem.

However, if you're going to miss a recitation section without much warning – you missed your bus, you overslept, you have a medical emergency – then your first priority should be to *get someone to the classroom* to cover for you. You should do the following:

- Send a message to #phy211staff on Slack asking someone to cover for you. If there's no answer in two minutes...
- Call Walter at (520) 409 3766, Merrill, and Matt, in that order. If you can't get them...
- Call the Physics Department office at (315) 443 3901 if it's between 8am and 6pm
- If it becomes apparent you're going to be more than five minutes late and nobody can cover, email your students.

If you have a student who is being disruptive and won't stop, you may ask them to leave your class. If a student is being *extremely* disruptive to the point where it jeopardizes the wellbeing of the other folks in the room, please do whatever you need to do to protect your safety and the safety of your students, including calling the Department of Public Safety at (315) 443 2224. (This is very rare but it has happened).

Course Rhythm

First, the schedule. A typical week in PHY211 will go like this:

- Monday: TA's and coaches finish preparing for recitation exercises. Merrill prints copies of recitation materials Monday or Tuesday. Staff meetings possibly Monday afternoon.
- Tuesday: Walter and Matt teach lecture in the morning. Staff meetings in the afternoon.
- Wednesday: TAs teach recitation with coaches. Homework due.
- Thursday: Walter and Matt teach lecture in the morning. Recitation materials for the next week planned out.
- Friday: TA's teach recitation with coaches. Walter and Matt finalize recitation materials for the next week and send them out to TA's and coaches.
- Weekend: TA's and coaches begin preparing for the next week's recitation exercises if desired.

On weeks when we have an exam, this is modified:

- Monday: Merrill prints copies of exam and recitation materials.
- Tuesday: Proctor exam in the morning. Collect and store exams. Abbreviated staff meetings. Students submit homework to TA mailboxes.
- Wednesday: Grade exams all day; no recitation.
- Thursday: Walter and Matt teach lecture in the morning. Recitation materials for the next week planned out.
- Friday: TA's teach recitation with coaches and return exams. Walter and Matt finalize recitation materials for the next week and send them out to TA's and coaches.
- Weekend: TA's and coaches begin preparing for the next week's recitation exercises if desired.

TA duties in detail

Recitation Sections

Your chief responsibility will be to lead recitation sections. Each Wednesday and Friday, about twenty students will come to your classroom to hone and practice the skills they have learned in lecture. Since physics is a particular perspective on the world and a set of analytical and mathematical skills, rather than a list of facts, students *cannot* learn the essence of physics without lots of practice – and without a skilled guide by their side. Learning physics is like learning to play the piano: all the teacher can do is provide advice, but it's up to the pianist to do the hard work of sitting down at the piano and training their fingers and mind to play the instrument.

For each recitation, we will provide a set of activities – exercises for the students in which they analyze physical situations that are designed to guide them through the skills they are learning. You will spend most of your time walking around the room and talking to students, responding to their questions, and asking them leading questions of your own designed to gently guide them toward insight.

On the first day of class, split the students into groups of three. You may do this in any way you want. They'll stay in these groups for a few weeks until the first exam.

You shouldn't spend much time at the board lecturing; do this only if there is some concept that most of your class doesn't understand. However, since our objective is for students to gain confidence and skill in figuring things out for themselves, they should spend most of their time

actively working, rather than listening to you.

If all the students don't finish all the recitation materials in the class period, that's fine; often we will write more materials than most of the students will need, since we don't want students to "run out of things to learn".

Recitation Participation Grading

Early in each recitation section, pass around a sign-in sheet. This serves as a record of who was physically in your room. When recitation is over, you should make additional notes on how diligently they worked with their group, with a grade out of three:

3: worked diligently during the entire class period, collaborating with their group, and asking questions as they have them

2: worked diligently but did not collaborate well with their group, or arrived somewhat late, or were not learning during some part of the period

1: were significantly late, or did not get much work done

0: not present, or were not working for half of the class or more (texting, etc.)

If you have a student who has missed recitation for an excused reason, write their name with an E on your attendance sheet. Then, transfer the grades from your attendance sheet to a spreadsheet of your own. We'll ask for those at the end of each unit to transfer the participation grades to Blackboard.

Working with Coaches

You'll have some undergraduate coaches in your recitation section as well. These folks are people who have taken PHY211 in the past and are now working as part of the teaching team. In my experience the coaches are often the best instructors we have – better than I am, and better than you are – because they were so recently students themselves and remember what it's like to learn this stuff for the first time. They will mostly do the same things you will do – run around, talk to students, and respond to raised hands and students' questions.

However, even though the coaches will often be better instructors than we are, we generally know more physics than they do. Part of your job is to serve as an "expert in the room"; if the coaches are presenting things to students in a way that is confusing or incorrect, you will have the background needed to clarify things. Generally the coaches are excellent, but if you encounter a situation where a coach is regularly unprepared or making mistakes, please let me know so I can steer things back on course.

Weekly Staff Meetings

We'll schedule two staff meetings on Monday and Tuesday at times that accommodate everyone. You will need to come to one or the other each week. During those meetings, we'll discuss how things have gone in the previous week and what we're teaching them in class. We'll have a series of coaches work through the exercises for the upcoming week on the board, and discuss what aspects of the exercises the students will likely find challenging, what we're trying to teach them, and how to help them.

This also serves as good practice for everyone, especially in the situation where a coach makes a mistake. In that event, respond to them like you would one of the students: don't just tell them the answer, but ask them leading questions to help their understanding.

Homework

Homework in this class is purely traditional (i.e. they solve problems with pencil and paper). They will generally submit homework sets to you every Wednesday in recitation. The exception to this is on weeks when we have an exam; on those weeks, they will submit it to your mailbox on Tuesday.

Granting extensions for late submissions to students is at your discretion; in general, be fairly lenient in giving extensions to students who are working diligently on the homework and require a little extra time.

In each homework set, you will grade two problems out of ten points and examine the solution for correctness, using the following rubric:

- 10: solution correct and well-explained
- 8-9: solution mostly correct, but minor flaws in the solution or its explanation that do not reflect a deficiency in physics knowledge
- 7-8: solution reflects physical insight and a basic understanding of the principles, but with errors that *do* reflect a flaw in physics knowledge
- 5-6: solution partially correct, but with significant deficits that prevent the student from completing the problem, or significant omissions
- less than 5: some work that indicates knowledge, but not significant progress to a solution

Keep in mind that in this class, the breakpoints between A/B/C/D/F are 80/65/55/50.

You may deduct points for things that are not well-explained, and may deduct significant credit for solutions that have numbers substituted in for variables too early (so they consist of lines of arithmetic that makes little narrative sense rather than algebra that shows what the student is doing and thinking), even if the final answer is correct.

You will grade the remaining problems out of two points. This shouldn't take you long; you are basically looking to see if the student made an honest attempt at the problem. Use the following rubric:

- 2: a solution which could be correct
- 1: a partial solution or a good start on the problem
- 0: Nothing, or nothing substantive

You may at your discretion deduct a small amount of credit from the whole homework assignment if it isn't stapled, or if the student hasn't done each problem on a separate side of a piece of paper, as long as you tell them to do this. (This makes it easier for us to grade, and also encourages the students not to try to smush their problems into the smallest amount of paper possible and thus confuse themselves.)

Maintaining Gradebooks

In the first two weeks of class, you'll create a section-by-section "Smart View" of your students on Blackboard. You are responsible for uploading your students' homework and exam grades on Blackboard. If a student has a question or complaint about their grade, you have authority to change their grades within reason. If there is a clear error in a student's exam grade, you can fix it.

If a student wants to *appeal* their exam grade, then you can either hear their appeal (but not during recitation when other students need you!) or send them to Walter or Matt. However, if they are appealing something other than an arithmetic error, you can ask them to work the problem out for you without notes on the blackboard. Their grade should be based solely on what they wrote down during the exam, but per the class policy in order to hear *any* appeal, they first need to demonstrate that they know what a correct solution is!

Exams

We will have three midterm exams and a final, on the following dates:

- Exam 1: **4 February**, 9:30-11 and 11-12:30
- Exam 2: **3 March**, 9:30-11 and 11-12:30
- Exam 3: **7 April**, 9:30-11 and 11-12:30
- Final: **4 May**, 3-5 PM

We'll need proctors on those days. Please plan to help proctor at least one of the sections each morning; on 4 May we'll need everyone or nearly everyone to help proctor.

All of these exams are long-answer problems, so we'll need to grade them the old-fashioned way. The three midterms are all on Tuesdays; please plan to spend a full day grading on the Wednesday afterwards. (This will be a lot of work and there's no way around it.) We will be cancelling recitations on those days, so everyone will be able to help grade.

We expect everyone to spend the whole day grading on those Wednesdays, except for academic/research conflicts (i.e. lab meetings, classes).

Paper Grading

We will be discussing the process of science in our class, and students will write a paper on pseudoscience/science denialism later in the term. You'll be responsible for grading these papers. We'll talk about this more as the time comes, but this is coming sometime in April and will be a fair bit of work.