Physics 1351
University of Pittsburgh – Fall 2025

Course

Intermediate[1] electricity and magnetism for upper-level undergraduate majors. Most of the course will be spent building on "statics," both electric and magnetic, and will culminate in their "dynamic" interplay. Mathematical rigor will be assumed and practiced.

Contact info

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Where to get help

There are a lot of resources. I recommend that you to find the one that works for you.

Office Hours

Please check Canvas for the specific hours and locations.

Resource Room

The Department of Physics and Astronomy provides a Resource Room staffed by physics graduate students. It is free. The drop-in hours will be available here (after week 1): http://www.physicsandastronomy.pitt.edu/resource-room

UTA Room

The Department of Physics and Astronomy provides a UTA room staffed by UTAs in introductory physics courses. It is free. The drop-in hours and information are at https://www.physicsandastronomy.pitt.edu/PhysicsUTA

Peer Tutoring

The School of Arts & Sciences Undergraduate Studies offers Peer Tutoring, either by appointment or by drop-in. It is free. Information is available online. https://www.asundergrad.pitt.edu/connected-community/peer-tutoring/

Your own peers

The best teachers may be your own peers in the course. I encourage you to form a study group or a homework group! Sizes between 3-5 are typically best for coordination.

Schedule

The current draft exam schedule is

- Exam 1 (take-home) Tuesday, Sep. 30 - Thursday, Oct. 2 TO BE CONFIRMED
- Exam 2 (take-home) Tuesday, Nov. 4 - Thursday, Nov. 6 TO BE CONFIRMED
- Final exam (take-home) Monday, Dec. 8 - Thursday, Dec. 11 TO BE CONFIRMED

See PHYS1351_schedule_DRAFT.xlsx for the schedule for the confirmation prior to the date.

[1] "Introductory" would typically be what freshman/sophomores take using a Halliday/Resnick-level textbook. "Advanced" would typically be what graduate students take using a Jackson-level textbook. "Intermediate" fills the gap.

Basic course information

Webpage

Canvas for this course can be accessed through your http://my.pitt.edu account.

Required text

David J. Griffiths, Introduction to Electrodynamics (5th ed.). Please note that earlier editions do not contain the Mathematica problems that we will engage in. *We'll focus on Ch. 1-7 at a rate of about a chapter every two weeks.* We will cover additional chapters and topics from as needed. There are PowerPoint slides about the textbook in OneDrive.

Other books that may be helpful

- E. Purcell and D. Morin, *Electricity and Magnetism (3rd ed.)*, Cambridge, 2013.
- Feynman, Leighton & Sands, *The Feynman lectures on physics II*, Addison-Wesley, 1964
- J. D. Jackson, *Classical Electrodynamics (3rd ed.)*, Wiley, 1999

University policies

Academic integrity

Students in this course will be expected to comply with the University of Pittsburgh's Policy on Academic Integrity. Any student suspected of violating this obligation for any reason during the semester will be required to participate in the procedural process, initiated at the instructor level, as outlined in the University Guidelines on Academic Integrity. This may include, but is not limited to, the confiscation of the examination of any individual suspected of violating University Policy. Furthermore, no student may bring any unauthorized materials to an exam, including dictionaries and programmable calculators.

To learn more about Academic Integrity, visit the Academic Integrity Guide for an overview of the topic. For hands-on practice, complete the Academic Integrity Modules.

Disabilities

If you have a disability for which you are or may be requesting an accommodation, you are encouraged to contact both your instructor and Disability Resources and Services (DRS), 140 William Pitt Union, (412) 648-7890, drsrecep@pitt.edu, (412) 228-5347 for P3 ASL users, as early as possible in the term. DRS will verify your disability and determine reasonable accommodations for this course.

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See Library of Congress Copyright Office and the University Copyright Policy.

As of Jan. 1, 2024.

Statement on classroom recording

To ensure the free and open discussion of ideas, students may not record classroom lectures, discussion and/or activities without the advance written permission of the instructor. Such recording properly approved in advance can be used solely for the student's own private use.

Professor Hong's addendum to this: Please do not upload my material to any website or any such forum. The material is also owned by the University, so please be aware.

Homework

No names

Please **do not** put your name on your homework, quiz, or exam. As a grader, it is not uncommon to develop biases over the course of the semester. I ask you to not put your name, nickname, or any identifiable information on your homework. Homework will not be graded if we can identify you.

Acceptable paper and pen colors

In the past, I've had a handful of students who use non-standard paper, such as blue paper, rip-out from spiral, etc. As a grader in my previous courses, I found these to be uniquely identifiable fairly quickly. Therefore, we will standardize the paper on which you will turn in your assignments. The most preferred is white, blank, letter-sized (8.5x11") paper that is commonly used in printers. If you prefer lines, then either graphing or lined paper that is letter-sized will be acceptable. Please do not use colored paper (it's easy to scan in greyscale or convert the photo to greyscale). Please try to stick to pencil, or blue and black pens, in the same spirit.

General comments

Points are more difficult to obtain than it is to lose. This is because there are more ways to do a problem incorrectly than correctly. Moreover, there are many aspects of problem solving that I expect you to get correct from previous courses. Examples include putting units in answers (only when appropriate), rounding results appropriately, boxing your final answers, showing your work, etc. There are not any positive points explicitly assigned to them, but it will be noted if done incorrectly. Please take the feedback as an effort to help you improve your final product.

Getting help and working together vs. cheating.

This is an advanced course, so I will not belabor the point. The general rule of thumb I will put forth is this: If more than about a third of your answer is not done by you, you are encroaching the cheating territory. Seeing someone else's answer then doing it yourself is like watching the end of the movie and pretending that you don't know how it ends while watching it; it is impossible to forget. You want someone like myself, TA, UTA, or tutor to guide you to the correct path, not show you the answer. More on this at the end of the syllabus.

How the course is graded?

My view

Here are aspects that I try to take in to account.

- **Student who knows it at the end** ("come-back kid") — Students feel that it's unfair to get a lower grade if one "aces" the final exam because their grade going into the final exam wasn't so high. After all, the student learned the material at the end, as required. My system accounts for this and allows such students.
- **Student who tries hard during the semester** ("hard worker") — Students want their efforts during the semester to pay off and not have the final exam determine their grades. After all, the course is not one exam. My system accounts for this and allows such students.
- **Student who wants to rack up points to relax on the final** ("Did so well during the course, the final is just formality") — In the standard adding of the points, in some rubrics it is possible that you acquired so many points prior to the final exam that you can do very poorly on the final exam and get an A grade. This is an undesirable feature from the educational perspective. My system accounts for this and does not allow it.
- **Curves vs. straight** — I don't want to go into the philosophy of this, because it's generally misguided, but students generally want "curved" unless there is a quota on good grades. There is no quota in my system and every student has his/her own curve.

Grade categories

To accommodate for these separate needs, I've come up with the following system where each student sets his/her own curve. Consider the following maximum points one can get from each category.

1. 0.20 | Homework
2. 0.10 | Quizzes
3. 0.10 | Exam 1
4. 0.10 | Exam 2

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   0.50 | Sub-total that one can get going into the final. I will call this $v_{prefinal}$

We also have the final exam as the last item.

5. 1.00 | Final exam score that one can get in the final exam. I will call this $v_{finalexam}$.

Grade combination

The total score in the course will add in the following way.

$$v_{grade} = (v_{prefinal} + v_{finalexam}) / (1 + v_{prefinal} \bullet v_{finalexam})$$

The v_{grade} will correspond to the letter grade in the following table.

Letter	v_{grade} lower bound	v_{grade} upper bound
A+	My discretion	100%
A	90%	My discretion
A-	87%	89.99%
B+	81%	86.99%
B	78%	80.99%
B-	75%	77.99%
C+	68%	74.99%
C	65%	67.99%
C-	62%	64.99%
D+	56%	61.99%
D	53%	55.99%
D-	50%	52.99%
F	0%	49.99%

Grade scale

A note on how I came up with this grading scale. I performed a linear transformation of the Quality Points (the one that gives you 4.0 for A, 3.0 for B, etc.) into a range for the lower threshold that corresponds to 90% for A and 50% for D-, then rounded the result to the nearest percent. As for A+, this is a special case and I split the difference between the gap between a whole letter grade instead of considering A-/B+ vs. B+/B split. The formula for the lower bound is, then, round[(90%-50%)(QP-0.75)/(4.0-0.75)+50%]. The upper bound was taken to be 0.01% less than the next lower bound. This is on the second tab of PHYS1351_set_your_own_curve.xlsx file if you want to see it worked out.

Features of the grading system

- Extreme comeback kid — This scheme allows anyone to "come back" in the final exam. No matter how you did in the course going in to the final exam, you can *always* get an A+. Say you had other things going on during the course and went in to the final with no points. This sets you up for

  1. 0 = 0 • 0.20 | Homework
  2. 0 = 0 • 0.10 | Quizzes
  3. 0 = 0 • 0.10 | Exam 1
  4. 0 = 0 • 0.10 | Exam 2

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  0 = 0 • 0.50 | Sub-total $v_{prefinal}$, so your curve is

  $$v_{grade} = (0 + v_{finalexam}) / (1 + 0 \bullet v_{finalexam}) = v_{finalexam}$$

  Here is how your final exam score then results in your grade. You can fill in intermediate values.

$v_{prefinal}$	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
$v_{finalexam}$	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
v_{grade}	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
Grade	F	F	F	F	F	D-	D+	C+	B	A	A+

  A final exam score of 50% (60%) [70%] {80%}‹90%› will be D- (D+) [C] {B} ‹A› grade.

- Hard worker — Say you tried hard, did well on the homework assignments (say 90%) and did well on quizzes (say 90%), you did decently on the two exams (say 80% and 75%), this sets you up for

  1. 0.180 = 0.90 • 0.20 | Homework
  2. 0.090 = 0.90 • 0.10 | Quizzes
  3. 0.080 = 0.80 • 0.10 | Exam 1
  4. 0.075 = 0.75 • 0.10 | Exam 2

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  0.425 = 0.85 • 0.50 | Sub-total $v_{prefinal}$, so your curve is

  $$v_{grade} = (0.425 + v_{finalexam}) / (1 + 0.425 \bullet v_{finalexam})$$

  Here is how your final exam score then combines. You can fill in intermediate values.

$v_{prefinal}$	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%
$v_{finalexam}$	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
v_{grade}	40.0%	48.1%	55.6%	62.5%	69.0%	75.0%	80.6%	85.9%	90.9%	95.6%	100%
Grade	F	F	D	C-	C+	B-	B	B+	A	A+	A+

  A final exam score of 50% (60%) [70%] {80%}‹90%› will be B- (B) [B+] {A} ‹A+› grade.

- A reasonably hard worker who still wants to be a comeback kid – I'm guessing that most students are somewhere in-between. So less than the "hard worker" above, but still respectably hard working. Didn't do so well in the two exams. This sets you up for

  1. 0.170 = 0.85 • 0.20 | Homework
  2. 0.080 = 0.80 • 0.10 | Quizzes
  3. 0.050 = 0.50 • 0.10 | Exam 1
  4. 0.065 = 0.65 • 0.10 | Exam 2

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  0.365 = 0.73 • 0.50 | Sub-total $v_{prefinal}$, so your curve is

  $$v_{grade} = (0.375 + v_{finalexam}) / (1 + 0.375 \cdot v_{finalexam})$$

  Here is how your final exam score then combines. You can fill in intermediate values.

$v_{prefinal}$	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%
$v_{finalexam}$	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
v_{grade}	36.5%	44.9%	52.7%	59.9%	66.8%	73.2%	79.2%	84.8%	90.2%	95.2%	100%
Grade	F	F	D-	D+	C	C+	B	B+	A	A+	A+

  A final exam score of 50% (60%) [70%] {80%}‹90%› will be C+ (B) [B+] {A} ‹A+› grade. This is still a reasonable target where every grade is "reachable" through studying.

- To summarize, each student sets his/her own curve. Please take a look at the Excel spreadsheet PHYS1351_set_your_own_curve.xlsx I've uploaded online in the Shared OneDrive folder. You can play with it yourself.

More details on my thoughts on cheating

- Resources: There are a lot of resources that may enable you to cheat. This may take the form of finding solved material online to "help you if you're stuck." This may take the form of asking someone to do the problem for you "because you have no idea how to start." None of these are acceptable. Because things may get murky when working together with others in my course, I will clarify what I consider an acceptable amount of overlapping work.

- 1/3 rule of thumb: If more than a third of your answer is not done by you, I consider it that you are encroaching the cheating territory. If you work together, keep this in mind as the general approach may be discussed, but not every detailed step. You may not copy work verbatim even if the total amount shared is less than 1/3.

- How to get help: Seeing someone else's answer is like watching the end of the movie and pretending that you don't know how it ends while watching it; it is impossible. What you want is someone—like myself, TA, UTA, or a tutor—to guide you to the correct path, not show you the answer.

- Consequences: Whatever your excuse may be, cheating will not be tolerated in this course. For homework, you may or may not get one written warning from me as courtesy, depending on the severity of the situation. For quizzes and exams, there will be no warning and no "deals" to "fail the exam but not the course."