

Physics 2213 : Fall 2015 Syllabus

Week	L	Date	Topic	Subtopics	Reading	Lab	Assignments
1	1	Aug 25	Electric Forces Coulomb's Law	Electric Charges & Forces	21.1-2		PS1 : MONDAY 8/31
	2	Aug 27		Coulomb's Law	21.3		
2	3	Sept 1	Computing Electric Fields	Electric Fields & Superposition	21.4-5	1	PS2 : 9/4
	4	Sept 3		Calculating Fields & Field Lines*	21.6-7		
3	Labor Day, Monday Sept. 7th (no classes)						
	5	Sept 8	Gauss' Law	Gauss' Law	22.1-3		PS3 : 9/11
	6	Sept 10		Gauss' Law II	22.4		
4	7	Sept 15	Electric Potential & Work	Electric Potential Energy, Voltage	23.1-2		
8	Sept 17	Calculating Electric Potential		23.3-5			
5	9	Sept 22	Conductors & Capacitors	Fields in Electric Conductors	22.5		PS5 : 9/25
	10	Sept 24		Capacitors & Capacitance	24.1-2		
6	11	Sept 29	Capacitors & Resistors	Capacitors, Dielectrics & Energy	24.3-5		PS 6 : Monday 10/5
	12	Oct 1		Current & Resistors	25.1-4, 25.6		
Oct 1 PRELIM #1 : 7:30 – 9:00 PM. Rockefeller Hall							
7	13	Oct 6	Circuits	Kirchoff's Laws : Circuits I	25.5, 26.1-2	3	PS7 : 10/9
	14	Oct 8		Kirchoff's Laws : Circuits II	26.2-3		
8	FALL BREAK (No classes Monday or Tuesday)						
	15	Oct 15	RC Circuits	Circuits w/ resistors & capacitors [†]	26.4		PS8 : 10/16
9	16	Oct 20	Magnetic Fields & Forces	Magnetic field & Lorentz force	27.1-5	4	PS9 : 10/23
	17	Oct 22		Magnetic forces on currents	27.6-7, 27.9		
10	18	Oct 27	Calculating Magnetic Fields	B fields from moving charges	28.1-2	5	PS10 : 10/30
	19	Oct 29		Biot-Savart Law	28.3-5		
11	20	Nov 3	Ampere's Law	Ampere's Law	28.6		PS11 : 11/6
	21	Nov 5		Ampere's Law, magnetic materials	28.7-8		
12	22	Nov 10	Induced currents & fields, Lenz's Law	Induced EMF, Faraday's Law	29.1-2		PS12 : Monday 11/16
	23	Nov 12		Lenz's Law and Motional EMF	29.3-6		
Nov 12 PRELIM #2 : 7:30 – 9:00 PM. Rockefeller Hall							
13	24	Nov 17	Energy in B field, Inductors	Displacement current, inductance	29.7, 30.1	6	
	25	Nov 19		Energy in B field & inductors	30.2-3		
14	26	Nov 24	LC Circuits	RL and LC circuits*	30.4-5		PS13 : Tuesday 11/24
	THANKSGIVING BREAK (No 2213 classes or sections Wednesday-Friday)						
15	27	Dec 1	LRC Oscillators & Light	LRC Circuits & Oscillators *	30.6, 31.5	7	PS14 : 12/4
	28	Dec 3		Maxwell's Equations & Light	32.1-4		
STUDY WEEK							
FINAL EXAM : TBD							

PS : Problem Sets

Optional Readings from Young & Freedman, vol. 2

* No discussion sections on Thursday 9/3, Friday 9/4, Tuesday 11/24, and Monday 11/30

† WF sections do not have a discussion section on Wednesday, 10/14. MW sections have section on 10/14 as usual

§ Rooms for Prelim 1 are Rockefeller 201 (Schwartz), 155, 122, 203, 230, and 231

¶ Rooms for Prelim 2 are Rockefeller 201 (Schwartz), 122, 132, 203, 230, and 231

- Online reading quizzes will be due 9:00 PM every Monday and Wednesday nights, before the respective Tuesday and Thursday morning lectures. No reading quizzes will be due on the nights before prelims (9/30 & 11/11).
- Problem sets are due Friday at 5 PM sharp (no late work accepted) in the homework boxes outside the physics office. On weeks with prelims (10/2 & 11/13), the due date will be extended to the following Monday at 5 PM. The week of Thanksgiving, the problem set will be due on Tuesday 11/24 (but can be handed in earlier).
- Prelims will be on Thursday evenings (10/1 and 11/12) at 7:30-9:00 in Rockefeller Hall. Prelim 1 will cover up to & including Lecture 10. Prelim 2 will cover up to & including Lecture 21.

Physics 2213 : Electromagnetism (Fall 2015)

Instructors

Lecturer : Professor Kyle Shen email : kshen@cornell.edu

Course Administrators : Professor Tomas Arias email : taa2@cornell.edu
Professor Peter Wittich email : wittich@cornell.edu

Course Registration : Rosemary Barber email : rjf2@cornell.edu
121 Clark Hall

Lecture Times

Lecture 1 : T Th 9:05 - 9:55 AM Rockefeller 201 (Schwartz)

Lecture 2 : T Th 11:15 AM – 12:05 PM Rockefeller 201 (Schwartz)

All registration issues (add/drop, section assignments) are handled by Rosemary Barber in Clark 121; please go to her office. Section swaps are not permitted except in cases of official class or varsity team conflicts. Do not contact the course staff about registration issues, as we have no control over the section assignments.

All administrative issues are handled by Prof. Peter Wittich (e.g. excused absences from exams, prelim conflicts, regrades, illnesses or emergencies). When contacting the course staff, please include “2213” in the subject of all emails, otherwise your emails may not be answered.

Required Materials

- *Learning Catalytics account* (\$12 / semester) & *smartphone or laptop*
- *Physics 2213 Lab Manual*

Recommended Texts

- *University Physics Vol. 2*, by Young & Freedman (12th-14th editions all fine)

Office Hours

Office hours for the course staff and TAs are posted on Blackboard. There will also be a study hall for help with problem sets on Tuesday - Friday afternoons in the Clark Hall 294 study area (rooms C or D); exact hours available on Blackboard) which will be manned by the course staff. Attendance is voluntary, but you must have worked on the problem sets on your own before attending the study hall.

Online Course Information

We will be using a “flipped classroom” format, which has been shown to be a more effective way for students to learn and succeed in physics. Development of expertise, whether in sports, music, or academics, requires primarily one thing : consistent and deliberate practice. The flipped classroom format allows us to maximize our time to practice working through problems. As such, we will be using a number of online resources to help with this new instruction format :

Blackboard : Like most of your other classes, we will use Blackboard (<http://www.blackboard.cornell.edu>; “**PHYS 2213 Electromagnetism F15**”) as the central hub for all class materials, including links to pre-lecture videos & readings, lecture notes, problem sets and solutions, handouts, and course announcements.

Learning Catalytics : Learning Catalytics (LC) is a web-based response system that is more powerful and flexible than the iClicker or the Blackboard response systems (<https://learningcatalytics.com>) which allows us to ask questions with numeric, symbolic formula, vector / direction, and sketch formats. LC can be accessed via laptop as well as tablet or smartphone, and will be used for our reading exercises, during lecture, as well as discussion section. You need to register for a LC account using your netID (approx \$12 / semester).

Piazza : Piazza is an online forum / message board, similar to Facebook, but designed for classes. Piazza allows you to ask the professors, TAs, and one another, questions about the course material (such as questions on a problem set), and to receive quick responses. Our Piazza forum will be accessible through Blackboard, but you will need to register first (free). The link is : <https://piazza.com/cornell/fall2015/phys2213f15>

Lecture Materials & Course Format

In order to maximize the amount of in-class time spent practicing our problem solving skills, you will be exposed to materials in the following order :

- 1. Lecture Videos / Reading** : You will be introduced to a new topic or concept through our video lectures (similar to a typical in-class lecture), to be watched before class. We will also post lecture notes as well as optional textbook readings.
- 2. Reading Exercises** : To reinforce the concepts introduced in the lecture videos, you will then do a short reading exercise on Learning Catalytics (typically < 30 minutes), due **9 PM the evening before lecture**.
- 3. In Lecture** : In the Tuesday / Thursday morning lectures, we will review any concepts that may have been particularly challenging or difficult from the previous evening’s reading exercise. We will spend most of the lecture time working through and solving various problems together (again using LC).
- 4. Discussion Section** : In the discussion section, the TAs will first clarify any particularly challenging topics and answering questions. The majority of the discussion

section will then be spent working through more complex problems in small groups with the aid of LC. *The problems in discussion section will be more advanced than in lecture, so you must attend a discussion section which takes place after your lecture* (i.e. if you are in a 10 AM Tu/Th section, you **should not** be in the 11 AM Tu/Th lecture).

Problem Sets

There will typically be one problem set assigned each week, usually due each Friday, unless noted otherwise. They should be turned in to your TA's slot in the gray homework collection boxes outside the Physics main office (Clark 117) **before 5 PM on Friday**. Solutions will be posted on Blackboard on Friday evening after the problem sets are collected. Late homeworks will not be accepted under any circumstances, although the grades for your lowest 2 problem sets will be dropped. **A portion of your problem set grade will be based on the presentation and completeness of your working.**

Discussion and collaboration on the problem sets is encouraged, but you must first attempt to solve as much as you can by yourself. **Step-by-step solutions or final answers are not to be posted or copied from Piazza, although conceptual questions are welcome.** We have set up a "study hall" for students to gather to work on problems on which they have gotten stuck or could not solve themselves. However, you must have worked on the problems on your own before coming to the study hall. The ability to solve the problem sets **on your own** is the "gold standard" against which to assess your true understanding of the material. **If you do discuss your work with other students, please write the names of the other group members on your problem set.** Simply copying your classmates' problem sets will be self-defeating, as you will not have learned the material well enough to perform well on the prelims and exams, which are worth a much larger fraction of your grade.

Exams

Prelim 1 : October 1st, 7:30 – 9:00 PM (Rockefeller 115,122,201,203,230,231)

Prelim 2 : November 12th, 7:30 – 9:00 PM (Rockefeller 122,132,201,203,230,231)

Final Exam : Time and location TBD

Any conflicts or special needs must be communicated to Prof. Wittich at least two weeks prior to the corresponding prelim or final. If you have any emergencies, you must contact Professor Wittich as soon as possible prior to any prelim or exam.

Labs

There are 7 two-hour labs, and a pre-lab sheet should be turned in at the beginning of lab to your TA. There will be no makeup labs; if you have a conflict, you must contact the lab TAs one week in advance to arrange attendance of another section and let your regular lab TA know. The first missed lab will not be counted against your grade; subsequent missed labs will lower your final grade by one mark (e.g. B- -> C+).

Grading

<i>Prelims (20% each x 2) :</i>	<i>40 %</i>
<i>Final Exam :</i>	<i>25 % (5% bonus weight to highest score)</i>
<i>Problem Sets :</i>	<i>15 % (lowest 2 scores dropped)</i>
<i>In-Lecture Questions :</i>	<i>5 % (lowest 5 scores dropped)</i>
<i>Pre-Lecture Exercises :</i>	<i>5 % (lowest 5 scores dropped)</i>
<i>Cooperative Exercises :</i>	<i>5 % (lowest 5 scores dropped)</i>
<i>Pre & Post Tests :</i>	<i>1 % bonus (administered through department)</i>
<i>Participation in Section :</i>	<i>2 % bonus (determined by TA at end of semester)</i>

To foster a collaborative atmosphere, Physics 2213 will not be graded on a curve, and you will not be in competition against your classmates. If you encounter conditions that make it difficult for you to work (physical, emotional, family crisis, etc...), please let Prof. Wittich know as soon as possible so that we can discuss how to make any necessary accommodations. There will be no make-ups allowed for late or missed problem sets or LC sessions.

Your two lowest problem set scores will be dropped from the calculation of your final grade. Your lowest 5 reading exercises, your lowest 5 in-lecture LC sessions, and your lowest 5 cooperative exercises will also be dropped. In addition, if you score 70% or higher in any of the in-lecture or reading exercise LC sessions, your score will be rounded up to 100%. **Your TA will also assign a bonus grade worth up to 2% at the end of the semester, based on your participation in discussion section.**

The highest score among your prelims and final will be given an additional bonus 5% towards your final grade (i.e. if your second prelim score was your highest raw score amongst the three exams, it will be weighted as 25% rather than 20% of your final grade). Your graded prelims will be returned to you in section. If you believe there is a grading error, you must return a brief written explanation of the error together with the prelim to the TA before the end of that class period. Otherwise, prelim grades become final immediately after the period in which your paper is returned.

Academic Integrity

Each student in this course is expected to abide by the Cornell Code of Academic Integrity. "Any work submitted by a student in this course for academic credit will be the student's own work." This includes exams, problem sets, reading exercises, Learning Catalytics responses, etc... The only exception is cooperative work in Discussion Section, which must represent the *full involvement of all members*. It is forbidden to enter LC responses for another student who is not present in Discussion Section or Lecture. We will impose the highest penalties permitted for violation of this policy. For further details see: <http://cuinfo.cornell.edu/Academic/AIC.html>