Physics 111: Physics for Scientists and Engineers 2
Fall 2014.

Welcome!

Instructor: Dr. Rebecca Rosenblatt

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Office Hours: Tuesday 3 pm – 4 pm & Thursday 2 pm – 3 pm (or by appointment)

Course Meeting Times:

Lecture: MTW Moulton Hall Room 214, 1:00 pm -1:50 pm
Recitation: R Moulton Hall Room 214, 1:00 pm -1:50 pm
Lab: F Moulton Hall Room 217, 8:00 am - 10:50 am
Moulton Hall Room 217, 11:00 am – 1:50 pm
(Please attend your assigned lab time unless previous arrangements have been made with your instructor.)

smartPhysics

You will need to get smartPhysics access and do the first Prelecture and Checkpoint before you go to the first lecture.

1. Go to www.smartPhysics.com (can see it in reggienet)
2. Click on the Register button, and create an account using your "UID@ilstu.edu" email address. You can also register using your Facebook account by clicking on the Facebook logo.
3. Complete your profile, then click on the Enrollments Tab
4. Click on the [Join a Course] link and enter 41405f86
5. Enter your Unique Identifier, (e.g. your UID whatever is in front of "@ilstu.edu" in your email address) and click "Enroll Course"
6. Pay for the smartPhysics. (This is actually very low cost but you need it. You can do a trial for a while but it will not be long enough to cover the course.)

Clickers

We will be using clickers in every lecture. If you have not already done so, please register your clicker by visiting My.IllinoisState.edu. **Answering with another students clicker, or having another student answer questions using your clicker, is a serious academic violation!**

Course Description

Introduction

Welcome to Physics 111, Introduction to Electricity and Magnetism! In this course we will discuss the basic laws describing electric and magnetic fields and how they interact with matter. These topics are important, not only because they are extremely interesting in their own right (their discovery was probably the most important one in the 19th century), but also because they underlie almost all of modern technology, from computers to telecommunications, all of chemistry, and all of biology as well. Obviously completely understanding all that is beyond the scope of this one semester course! We will therefore focus on the basic principles, and their connection to applications from areas diverse as astronomy, engineering, medicine, and zoology. It is our goal that at the end of this course you will understand the main concepts of electricity and magnetism, be able to apply them quantitatively for solving relevant problems, and appreciate qualitatively how they play a role in nearly every aspect of our lives. The road to understanding is not a particularly easy one, but the journey is well worth the effort. In order to help you, we have devised a multifaceted approach intended to maximize your conceptual understanding and ability to solve practical problems.

The basic philosophy of Physics 111 can be summarized as follows:

1. Introduction and first chance to think about it (prelectures and checkpoints)
2. Untangle it (lectures)
3. Challenge yourself (homework)
4. Play with it & Close the loop (labs)

The order of the above items is very important.

The first exposure you will have to the material will be in the prelecture (1). These are research-based multimedia presentations designed to introduce the key ideas/concepts of the lecture. You will do these on your own prior to each lecture. This first step should be taken very seriously, as all of the following items depend on this pre-exposure.

To get the most out of lecture your participation is required both prior to and during each lecture! Before every lecture you will be required to work through a brief "checkpoint" on the Web. Each checkpoint will probe your understanding of the prelecture material for that lecture, and must be completed by 6am on the day of the lecture to receive credit. There are no "bad" checkpoint answers. You will receive full credit if you give it your best shot and answer all the questions.

The lecture (2) will take the concepts you have learned about and expand/explain them. The lectures themselves will be interactive, and your participation is strongly recommended. Student questions and comments in class are encouraged, especially related to concepts and problems you found difficult in the checkpoints. You will participate using the clicker and will get full credit if you give your best shot. You can also earn "extra-credit" for the questions you answer correct. Every other lecture is more of a discussion like time where we will work problems in small groups and continue to address areas of student difficulties.

The Web-based homework (3) covering each week's material is due the day after following the lecture day for full credit. This means that you must work hard not to fall behind! Homework problems are designed to test your understanding of the concepts as well as developing problem-solving skills. You may find them difficult. I strongly suggest working with a partner and coming to get

help at office hours. Another good strategy is to ask me questions about the homework in the 10 minutes before or after class. The questions usually build on themselves so if you cannot get #1 part a then it will be hard to get the follow up parts of that question. Also, feel talk with the TAs or utilize the tutor room.

The weekly lab cycle (4) is designed to give you the opportunity to explore the concepts you have encountered in lecture and integrate your knowledge into a more global understanding or theory and practice.

Also there will be open office hours every week to give you one-on-one assistance if you need more help; do not be bashful about taking advantage of these!

In order to succeed in Physics 111, you must not fall behind! This course covers a large amount of new material, and the understanding of new topics usually requires mastery of previous material.

Course Components

Prelectures+checkpoints: You are required to complete a web-based prelecture and checkpoint prior to each lecture. The prelectures are web-based multimedia learning activities that include embedded questions. You may attempt each question several times, however you must eventually answer all questions correctly to complete the activity. You will receive 2 points for each prelecture you complete. Once you have completed the prelecture, the checkpoint will be available. While we don't expect you to get correct answers to all of the checkpoint questions, they will be checked for a good faith effort. Each completed checkpoint is worth 1 point. There is no late credit for prelectures or checkpoints. Prelectures and checkpoints are administered from the smartPhysics server.

Lectures:

Since you will already have been exposed to the basic concepts through the prelecture, the lectures will spend relatively little time in the traditional lecture format. The primary focus of the lecture will be on expanding your understanding of the material based on your checkpoint responses. This will take the form of interactive learning segments. During these segments students will work in groups on a specific assigned question and can discuss the results with other students and with the lecturer. This format allows the instructor to pinpoint problems in understanding and deal with them before moving on. The purpose is to help you understand, and your participation is critical.

In order to provide an environment more conducive to participation and interaction, each student will have an "clicker" with which to answer various questions during lecture. You will receive one point based on your participation in each lecture. You may also earn up to one additional "bonus" point for each lecture based on the fraction of the clicker questions you answer correctly. These bonus points will be directly added to your Homework/Quiz final score. For example, if you get 50% of the clicker questions correct in each of the lectures (say 28 lectures), you would earn (28) "bonus" points that would directly increase your Homework+Discussion score. The slides from each lecture will be posted via reggie net as will any problems we work in class and quiz questions given.

Homework:

Each week you are responsible for completing two computer-based homework assignments. These assignments are graded and are an important part of the course. The only way to really understand these topics is to work lots of problems.

The homework assignments consist of both immediate feedback and delayed feedback questions. The immediate feedback questions, as the name implies, give immediate feedback to your submitted answers. All answers are judged as correct or incorrect, and for some specific answers, we provide additional explanatory information about your submission. There is no limit to the number of submissions you can make to the immediate feedback questions and there is no penalty assessed for extra submissions. Full credit is given if you submit the correct answer prior to the deadline. In addition, for those questions you do not answer correctly before the 11:59 pm Tuesday or Thursday deadline, we give you a one week extension to do them and assign 80% credit for correct answers. It is NOT recommended that you routinely use this deadline as a first submission. This is there if you have missed a delayed feedback question, emergencies, or simply to give credit for students continuing to work to understand the material and succeeding in doing so. Included in the immediate feedback questions are Interactive Examples that have extensive help sequences designed to aid understanding.

The delayed feedback questions usually appear at the end of the assignment. As the name implies, no feedback is given on any submission before the deadline. Credit is given based on the last answer submitted prior to the deadline. The purpose of these delayed feedback questions is to provide a test of your understanding of the situation described in the problem. The idea is that if you understand fully the solution to the immediate feedback questions in a given problem, we believe you should be able to correctly answer the delayed feedback questions in that problem. Once the deadline has passed, you can find out whether your answers were correct or not and if not, you are given a one week extension and the questions become immediate feedback questions; the maximum credit given for a correct answer after the initial deadline is 80%.

Homework assignments are administered from smartPhysics.

Lab Session:

Each of the three-hour laboratories will involve a series of activities, including (i) setting up simple experiments to study topics studied in class, (ii) making predictions about the outcome of your experiments, (iii) performing measurements of different phenomena you have studied, (iv) working through worksheets designed to mesh the theory with the hands on activities (v) analyzing your results, and (vi) answering questions concerning your results and predictions. In addition, at the end of each lab, you are expected to turn in response to a subset of the lab questions and findings. These will be graded for correctness and counted as part of the total lab score.

The lab sections start the first week of the course.

Discussion Sessions:

Each Tuesday and Thursday the lecture time will be used for a discussion section. These sections will be active learning sessions in which you will work in small groups solving problems provided. You should bring your labnote book, which has several group problems in addition to the labs, and your clicker. Discussion sessions are designed to aid you in the understanding of the course material. You will find them beneficial in preparation for the hour exams.

During each Thursday discussion session in which we don’t have an exam, I will administer a short quiz (usually about 15-20 minutes in length) based on the material covered in the previous week's prelectures, lectures and homeworks. This quiz will be graded and recorded in the gradebook. The quiz will start at 10:30. The session will otherwise be a study and review session. If you only come for the quiz you will not be given less points.

Exams:

Three 50 minute multiple-choice exams will be given. (See the schedule for the dates.)

Scores will be posted in the gradebook as soon as possible following the exam.

A formula sheet will be posted before the exam. Students are allowed to bring 1 standard size page of study material front and back of their own choosing.

Any conflicts with exams must be discussed with the instructor prior to the exam. Make up exams will be scheduled at the instructor's discretion. In cases of illness or similar last minute, unavoidable conflicts, arrangements will be made only for those with appropriate documentation (e.g. a doctor's note indicating that the student could not attend due to illness).

Grading

Your final grade for Physics 111 will be based upon your total score on all the components of the course. The total possible score is 1000 points, broken down as follows:

Course Component	Points
Prelectures + Checkpoints + Lectures	100
Homework + Discussion Quizzes	250
Labs	150
Hour Exams (100 each)	300
Final Exam	200

The breakdown of total points versus course letter grade will be approximately:
A (900), B (810), C (720), D (610), and F(<610).

Note that we will NOT use the common 90/80/70/60 breakdown for letter grades; the cutoffs are generally higher. The reason for this is that for some parts of the course the average score is typically very high. For example, there is no reason you should not be able to score 100% on your web-based homework and checkpoint assignments. You should also be able to do very well on labs

and quizzes. Please note however that if you fail to do well on this typically high scoring parts of the course you will have a very difficult time getting the grade you would like.

Prelectures + Checkpoints + Lectures: There will be 26 lectures (1 pt) , each with a corresponding prelecture (2 pts) and CheckPoint (1pt). Therefore, if you completed all of these activities, they would add to a total of 104 points (8 points more than the maximum allowed). This is done so that if you are sick, have a conflict, or just forget, you can miss a few of these activities without any penalty in your grade. In addition to the 4 points/lecture listed, you may also earn up to 1 "bonus" point per lecture based on the fraction of the clickers that you answer correctly during that lecture. These bonus points will be added to your Homework/Discussion score.

Homework & Discussion: There will be homework sets, discussion lecture days, and discussion lecture quiz days. There are 28 hw sets – 2 are matematica based, 12 quizzes and 15 discussion tuesdays (graded based on participation). They will go into the “homework&discussion” grade as 100, 100, 50 points respectively. You may drop 2 hws, 2 quizzes, and 2 discussions. Once this score is computed, your bonus points from lecture will be added, up to a maximum score of 250 points. For example, if you had an average homework&discussion score of 90%, and 15 bonus points from lecture, your Homework/Discussion score would be (.9 x 250) + 15 = 240.

Labs:

There are 15 labs. 2 labs may be dropped. The labs will be graded on an 80% attendance and participation & 20% correctness basis. Some weeks the labs may only be graded on participation; however we to keep students working at their best we will use the 20% as needed to encourage hard work during lab time.

Gradebook

You will be able to view your grades on all components of the course using the course gradebook through reggienet. During the semester, you should check that your lab and quiz grades are correctly entered in the gradebook; any problems here should be brought to the attention of your instructor immediately.

Academic Integrity

All activities in this course are subject to the Academic Integrity rules. Infractions include, but are not limited to: cheating, plagiarism, fabrication, academic interference, computer-related infractions, unauthorized use of university resources, sale of class materials or notes, and facilitating infractions of academic integrity. Violations of any of these rules will be prosecuted and reported to the home college of the student. All aspects of the course are covered by these rules, including quizzes, homework, clickers, exams and labs.

Other Course Information

Research on Learning: As part of our ongoing effort to improve instruction, data from student performance in this course may be used in research projects. The instructor will inform students if/when this is happening specifically. Any data used will be compiled in aggregate form and in no way will your name be used to identify you with the data. If you object to the use of data on your performance in a research

project, please contact your instructor and we will remove your data from any projects.

Week	Date	Pre-Lecture	Check-point	Lecture	Lab	Homework
1	Monday 8/18/2014	1	1	Lecture 1: Introduction and Coulomb's Law		
	Tuesday 8/19/2014			Discussion 1		Homework #1 Due 11:59pm
	Wednesday 8/20/2014	2	2	Lecture 2: Electric Fields		
	Thursday 8/21/2014			No quiz		Homework #2 Due 11:59pm
	Friday 8/22/2014				Lab 1: Coulomb's Law: Electrostatic Charges	
2	Monday 8/25/2014	3	3	Lecture 3: Electric Fields and Electric Flux		
	Tuesday 8/26/2014			Discussion 2		Homework #3 Due 11:59pm
	Wednesday 8/27/2014	4	4	Lecture 4: Gauss's Law		
	Thursday 8/28/2014			Quiz 1: Coulomb’s Law		Homework #4 Due 11:59pm
	Friday 8/29/2014				Lab 2: E fields & Gauss’s law	

Week	Date	Pre-lecture	Check-point	Lecture	Lab	Homework
3	Monday 9/1/2014			NO CLASS LABOR DAY		
	Tuesday 9/2/2014	5	5	Lecture 5: Electric Potential		
	Wednesday 9/2014	6	6	Lecture 6: Electric Potential		Homework #5 Due 11:59 pm
	Thursday 9/4/2014			Discussion 3 Quiz 2: Electric Flux & Gauss's Law		Homework #6 Due 11:59 pm
	Friday 9/5/2014				Lab 3: Potentials and E fields	
4	Monday 9/8/2014	7	7	Lecture 7: Capacitance		
	Tuesday 9/9/2014			Discussion 4		Homework #7 Due 11:59 pm
	Wednesday 9/10/2014	8	8	Lecture 8: Capacitance		
	Thursday 9/11/2014			Quiz 3: E fields and Potentials		Homework #8 Due 11:5922m
	Friday 9/12/2014				Lab 3: Capacitance	

Week	Date	Pre-lecture	Check-point	Lecture	Lab	Homework
5	Monday 9/15/2014	9	9	Lecture 9: Simple Circuits		
	Tuesday 9/16/2014			Discussion 5 Quiz 4: Capacitance		Homework #9 Due 11:59 pm
	Wednesday 9/17/2014			Exam 1 Review		
	Thursday 9/18/2014			Exam 1		
	Friday 9/19/2014				Lab 5: Circuits	
6	Monday 9/22/2014	10	10	Lecture 10: More on Kirchoff's Laws		
	Tuesday 9/23/2014			Discussion 6		Homework #10 Due 11:59 pm
	Wednesday 9/24/2014	11	11	Lecture 11: RC Circuits		
	Thursday 9/25/2014			Quiz 5: Circuits		Homework #11 Due 11:59 pm
	Friday 9/26/2014				Lab 6: Kirchoff's Laws & RC	

Week	Date	Pre-lecture	Check-point	Lecture	Lab	Homework
7	Monday 9/29/2014	12	12	Lecture 12: Magnetic Force		
	Tuesday 9/30/2014			Discussion 7		Homework #12 Due 11:59 pm
	Wednesday 10/1/2014	13	13	Lecture 13: Forces and Magnetic Dipoles		
	Thursday 10/2/2014			Quiz 6: RC Circuits		Homework #13 Due 11:59 pm
	Friday 10/3/2014				Lab 7: Magnetic Fields & Forces	
8	Monday 10/4/2014	14	14	Lecture 14: Bio-Savart Law		
	Tuesday 10/5/2014			Discussion 8		Homework #14 Due 11:59 pm
	Wednesday 10/6/2014	15	15	Lecture 15: Ampere's Law		
	Thursday 10/7/2014			Quiz 6: Magnetic Fields & Forces		Homework #15 Due 11:59 pm
	Friday 10/8/2014				Lab 8: Bio & Ampere’s	

Week	Date	Pre-lecture	Check-point	Lecture	Lab	Homework
9	Monday 10/13/2014	16	16	Lecture 16: Motional EMF		
	Tuesday 10/14/2014			Discussion 9		Homework #16 Due 11:59 pm
	Wednesday 10/15/2014	17	17	Lecture 17: Faraday's Law		
	Thursday 10/16/2014			Quiz 7: Bio and Ampere's Laws	Lab 9: Motional EMF and Faraday's Law	Homework #17 Due 11:59 pm
	Friday 10/17/2014					
10	Monday 10/20/2014	18	18	Lecture 18: Self-Inductance RL Circuits		
	Tuesday 10/21/2014			Discussion 10		Homework #18 Due 11:59 pm
	Wednesday 10/22/2014			Exam 2 Review		
	Thursday 10/23/2014			Exam 2		
	Friday 10/24/2014				No Lab!	

Week	Date	Pre-lecture	Check-point	Lecture	Lab	Homework
12	Monday 10/27/2014	19	19	Lecture 19: Oscillations and LC Circuits		
	Tuesday 10/28/2014			Discussion 11		Homework #19 Due 11:59 pm
	Wednesday 10/29/2014	20	20	Lecture 20: AC Circuits		
	Thursday 10/30/2014			Quiz 8: Motional EMF & Faraday's Law		Homework #20 Due 11:59 pm
	Friday 10/31/2014				Lab 10: RLC and AC Circuits	Matematica HW #1 Due 11:59 pm via Dropbox in Reggie
13	Monday 11/3/2014	21	21	Lecture 21: AC Power & Resonant Circuits		
	Tuesday 11/4/2014			Discussion 12		Homework #21 Due 11:59 pm
	Wednesday 11/5/2014	22	22	Lecture 22: Maxwell's Displacement Current and Electromagnetic Waves		
	Thursday 11/6/2014			Quiz 9: RLC and AC Circuits		Homework #22 Due 11:59 pm
	Friday 11/7/2014				Lab 11: Resonance and Waves	

Week	Date	Pre-lecture	Check-point	Lecture	Lab	Homework
14	Monday 11/10/2014	23	23	Lecture 23: Electromagnetic Waves, cont.		
	Tuesday 11/11/2014			Discussion 13		Homework #23 Due 11:59 pm
	Wednesday 11/12/2014	24	24	Lecture 24: Reflection and Refraction		
	Thursday 11/13/2014			Quiz 10: Resonance and waves		Homework #24 Due 11:59 pm
	Friday 11/14/2014				Lab 12: Waves & Reflection/ Refraction	
15	Monday 11/17/2014	25	25	Lecture 25: Lenses		
	Tuesday 11/18/2014			Discussion 14 Quiz 11: Reflection and Refraction		Homework #25 Due 11:59 pm
	Wednesday 11/19/2014			Exam 3 Review		
	Thursday 11/20/2014			Exam 3		
	Friday 11/21/2014				No Lab	
HOLIDAY WEEK!						

Week	Date	Pre-lecture	Check-point	Lecture	Lab	Homework
16	Monday 12/1/2014	26	26	Lecture 26: Mirrors		
	Tuesday 12/2/2014			Discussion 15		Homework #26 Due 11:59 pm
	Wednesday 12/3/2014			Review for Final		
	Thursday 12/4/2014			Quiz 12: Lenses and Mirrors Review for Final		
	Friday 12/5/2014				Lab 13 Lenses & Mirrors	Matematica HW #2 Due 11:59 pm Via Dropbox in Reggie