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Physics 142 Electricity and Magnetism Spring 2015

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Physics 142 Spring 2015

Instructor: Dr. Carl Lorenz

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Office Hours: Monday: 11AM, Noon; Wednesday: 11AM, Noon; Friday: 11AM.

Text: *Fundamentals of Physics, 10th edition, extended, by Halliday, Resnick and Walker.*

Prerequisite: Calculus 2 or equivalent.

Materials: You will need a calculator that can do algebraic and trig functions, as well as statistical functions. A TI calculator would be preferred.

Content: This course surveys a collection of physics principles that were discovered during the 1800's. In the middle part of the century, a number of laws were discovered that govern the transfer of energy from one form to another. The goal of the workers at the time was to find ways of converting stored energy (bottled up in fuel) into usable work. One fascinating conclusion was that an engine cannot operate at 100% efficiency. This is the science of thermodynamics and this conclusion puts natural limits on our technological capabilities.

A somewhat unrelated development of the time was the discovery of two new forces in nature, the electric force and the magnetic force. An electric force exists between two particles if they each possess a quantity called charge. A magnetic force exists if there is relative movement of the charges. The first quarter of our course will be spent on thermodynamics, the remainder on electricity and magnetism.

<u>Week</u>	<u>Chapter</u>	<u>Topic</u>
1-12	18	Temperature, Heat, First Law
1-19	19	Kinetic Theory
1-26	20	Engines, 2 nd Law
2-2	21	Electric Field, Coulomb, <u>exam 2-6</u>
2-9	22	More Electric Field
2-16	23	Still More Electric Field
2-23	24	Electric Potential
3-2	25	Capacitors, Dielectrics, <u>exam 3-6</u>
3-9	26	Electric Current
3-16	--	DC Circuits
3-23	27	*** Spring Break ***
3-30	28	Magnetic Field, <u>exam 4-3</u>
4-6	29	More Magnetic Fields
4-13	30	Magnetic Induction
4-20	31	Magnetism in Materials
4-27	32	AC Circuits, <u>exam 5-1</u>
5-4	---	Review

Lecture

Lectures will have an interactive workshop format, driven by PowerPoint instructional resources. We will work together in learning teams, each team of about three people. I will begin each lecture with an overview of the agenda and highlight points of emphasis and facilitate additional instruction and clarification as the team experience develops. At all times, we can have discussions about homework problems and go back to previous lectures as the need arises. The goal of each lecture is to not only grasp the principles presented but also to make progress in their application, and to get a strong start on homework challenges, an area that is historically weak in Phy 142.

The lecture PowerPoints will give you a complete development of the material, from the presentation of the foundation principles to example calculations, sketches, strategies as well as questions and problems for the team to tackle. Intermittently, when the team has achieved certain goals, you will be prompted to touch base with me regarding your progress.

There is a participation grade for lectures, on a scale of 0-2. With this type of format, it can be a challenge to stay on task. So while the goal is to enjoy the process and work at a pace that is comfortable for you, try to encourage one another along the way. The more we can accomplish in here, the less you will need to do when you go it alone outside of class. I hope not to have to assess 0's and 1's, but here is a guideline. A grade of '2' is for satisfactory progress and a strong team focus. A grade of '1' will be assessed if a chronic lack of focus seems to be hindering the pace and quality of the learning process. A grade of '0' will be assessed for evil things like falling asleep, facebooking, texting, web-surfing ... you get the idea. The total of your participation grades will count for 5% of your overall course grade.

Each lecture will be posted on the Cobra Learning system at least 24 hours in advance of the lecture. Not a bad idea to peruse it before coming to class. The computer tablets that we use have note-taking capability, and you are strongly encouraged to use this feature. But some find they prefer taking notes on paper. I will provide a hardcopy of the PowerPoints only if a computer is not available to you. With budget crunches, hardcopies are limited, so you might consider printing out a copy for yourself before class if you so desire.

In addition to the PowerPoint uploaded on Cobra Learning, I will also upload a pdf version as well. I invite you and encourage you to bring your own laptop if you wish with the pdf version downloaded. As a matter of fact, the visual quality of the pdfs are almost as sharp as the PowerPoints. And because we have a shortage of tablet PC's, it would be great if a few folks brought their own PC's. However, the same guidelines apply on the 0's, 1's, and 2's.☺

It would be good to bring a flash drive to every class. If you have PowerPoint loaded on your computer, save your work as a pptx, otherwise save as an Adobe pdf to view later.

Quizzes, Exams, etc.

Homework assignments and due dates are listed on the HW document. Homework will not be handed in for a grade, but you are encouraged to keep a notebook of completed homework problems. Homework assignments will also be posted on Cobra Learning.

Try to set a firm goal for yourself to come to each lecture having prepared the assignment that is due. Seek out help from Peer Tutoring or come to talk to me during office and lab hours, but try your very best to stay current with homework. I welcome HW questions and am willing to give hints and strategies for solving them, but I will stop short of working out the problems for you in detail. There really is no substitute for spending the time yourself, even though it can get frustrating at times. There are some very challenging topics in 142 and even the very best students struggle at times.

During the last 10 minutes of each lecture session, there will be a quiz that will be due at the end of the session. You can work together in your team on quizzes. Quizzes will typically be similar to or at least related to the homework assignment that is due at that session. Quizzes will also have a competitive aspect to them as well. The first team to submit a correct quiz will score a 3-pointer. The next correct quiz gets a 2, and all remaining correct submissions score a 1. These points accumulate for the groups and in subsequent sessions, the group can wager any or all of their points. Based upon quiz performance, team members will be eligible for extra credit on exams.

Correct quizzes accumulate extra credit for you in the overall course. Every correct quiz that you submit (it's all or nothing ... either correct or it's wrong) gives you an increase of 0.1% of your final course grade. Doesn't seem like much, but we will have something like 30-35 quizzes.

During the week of an exam, I will distribute a practice exam. The purpose of this is to help you sharpen up your skills, and get comfortable with the test-taking routine. On each exam, roughly 50-60% of it will be built around situations that are similar to homework problems, though they will not be exactly the same. I will make some revisions to problems you have done and may ask about other aspects of these problems. This component of the exam will be multiple-choice, so it is imperative as we approach an exam to have firm mastery of the body of homework related to the exam.

One goal of the novel lecture approach is to avoid the traditional exam crunch that tends to create so much stress and confusion, particularly toward the end of 142.

There will be 4 hour tests during the semester: 2/6, 3/6, 4/3, 5/1.

There is a final exam for the course: either Wednesday, May 13th from 8AM to 10AM or Thursday, May 14th from 8AM to 10AM.

Laboratory

You have registered for a lab section that meets for a 3-hour block of time each Tuesdays or Thursdays.

Each week there will be a handout distributed at the start of the lab session that will outline your experiment/activities.

During the first week of class and last week of class, we will be instituting an assessment test during the lab session.

We will keep lab sections at no more than 4 persons each (and 3 or fewer if possible).

It is important that you arrive on time to begin your lab session. A 5% deduction will be assessed in the grade for the lab if you arrive more than 10 minutes late. It may not be possible for you to start the lab if you arrive more than 20 minutes late.

Lab reports must be handed in before you leave the lab.

Data that you include must be legitimate data collected during the lab session. Lab reports from previous semesters will not be allowed into the lab rooms.

Lab reports which are copied in full or in part will be considered cheating and may result in a failing grade for the course.

<u>Week</u>	<u>Laboratory</u>
1-12	Assessment Pre-Test
1-19	Thermal Expansion
1-26	Specific Heat
2-2	Exam Review/Lab Assessment
2-9	Latent Heat of Fusion
2-16	Equipotential Surfaces
2-23	To Be Announced
3-2	Exam Review/Lab Assessment
3-9	Resistivity
3-16	Series and Parallel Circuits
3-23	*** Spring Break ***
3-30	Exam Review/Lab Assessment
4-6	Resistance-Capacitance
4-13	Specific Charge
4-20	LR Circuits
4-27	Exam Review/Lab Assessment
5-4	Assessment Post-Test

Grades

The grades are compounded in the following way:

4 one-hour tests	60%
2-hour final	20%
Labs	15%
Participation	5%

Letter grades will be assigned as follows: A - 90.0%, B - 80.0%, C - 70.0%, D - 60.0%.

You must earn 60% on the laboratory part of the course to receive a passing grade for the course.

You may drop your lowest one-hour test unless you have been absent (for any reason) for more than 5 of the lecture sessions. You will be counted absent if you miss more than 10 minutes of a given lecture session. Also, you may drop your lowest lab of the semester. The percentage allotted to the dropped items will be added to the percentage allotted to the final exam.

There will be no make-up quizzes, exams, or labs under any circumstances.

General Education

This course fulfills the following General Education objectives listed in the Parkland catalog. Students will:

- demonstrate their ability to solve problems, by collecting and evaluating facts and using methods of scientific inquiry;
- demonstrate their ability to compute and to think and express themselves effectively in quantitative terms.

Disability

If you believe you have a disability for which you need an academic accommodation (e.g., an alternative testing environment, use of assistive technology, or other classroom assistance) please contact Cathy Robinson (X148, 353-2082), Director of Disability Services, crobinson@parkland.edu. Also talk to me as soon as possible.

Center for Academic Success

If you find yourself needing assistance of any kind to complete assignments, stay on top of readings, study for tests, or just to stay in school, please contact one of the following staff at the Center for Academic Success:

Anita Taylor
Room: D120
Phone: 353-2005

Sue Schreiber
Room: D120
Phone: 351-2441

You may also email the CAS at CenterForAcademicSuccess@parkland.edu.

Academic Honesty

I have found there to be an increase in the frequency of cheating incidents in recent years. The Student Policies/Procedures Manual (www.parkland.edu/studentpolicy/honesty) defines cheating, fabrication, and plagiarism. Consequences can carry the penalty of a failing grade for the course and possibly suspension from the course.

Be mindful of a few ground rules regarding test-taking (quizzes will be collaborative efforts and do not apply here). Tests are closed-book and the following things would be considered cheating:

- exchange of materials of any kind (calculators, pencils, pens, information, anything)
- any talking
- looking at someone else's work

Core Values

I believe strongly in the Core Values espoused by Parkland College: Honesty and Integrity, Fairness and Just Treatment, Responsibility, Multiculturalism, Education, and Public Trust. Essentially, these values set guidelines for how we should treat one another. Failure to be respectful of one another or to maintain ethical behavior will not be tolerated.

Drops/Withdrawals

On the ten-day roster, I am required to assess your attendance. If you have not attended regularly to that point, you will be dropped with no refund of tuition or fees. After the ten-day roster, you should not plan on an instructor withdrawal if you want to withdraw from the course. You are ultimately responsible for your own withdrawal by the withdrawal date. Non-attendance after the ten-day roster will result in an F if you don't withdraw yourself.

Note: Please refer to the Syllabus Addendum document (posted on Cobra Learning) for additional College policies.