Physics 230:  General Physics III - Spring 2010

Instructor:  Jim Kelly

- Office:  Olin 011
- Office Hours:  MWF 10:20-11:20am, or by appointment, or just drop by
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- Course web site:  http://web.centre.edu/james.kelly/

Textbook:  Physics for Scientists and Engineers (7th ed., Ch. 1-39) by Serway & Jewett

Prerequisite:  MAT 171 & PHY 210 or permission from me.

Calculator Requirements:  Scientific calculators are required.  A graphing calculator is preferred.  The TI-83 & -84 are good choices.  Calculators that perform symbolic algebra, like the TI-89 or TI-92, will not be allowed on exams.

Content

Physics 230 is a calculus-based study of electricity, magnetism, and geometrical and physical optics.  In this course we get away from the mechanical picture of how things work that we used heavily in physics 210, and into a more abstract method of conceptualizing effects due to things that we cannot see.  We will be using a lot more calculus this term, but you will find that you really understand integration for the first time when you are able to digest the laws of electromagnetism.  The image at the top is a depiction of the magnetic field lines due to an electric current flowing through a coil.  This field is one of many pictures of things that we cannot see, not because it is too small or obscured from view, but rather because it is a convenient made-up way of imagining something that makes it easy to calculate the outcome of experiments.  Does such a magnetic field exist?  This is a tricky question that there is no clear agreement about.  For us, once we know how to use the field to make predictions then it will be consistent to say that it “exists”.

Items Affecting Your Course Grade

- We will have three 20-30 minute lecture quizzes worth 15 points each. Quizzes are comprehensive, but emphasize recent material.
- We will have three 60-minute exams worth 100 points each.  Exams are comprehensive, but emphasize material since the last exam.
- We will have a 180-minute final exam worth 200 points. The final exam is comprehensive.
- The homework assignments will be worth a total of 60 points of your final grade.  Assignments will be grouped by the book’s chapters.  We will be using an online homework system; please see the details on the following page.
- Your percentage score in lab will be converted to the corresponding percentage of 60 points.  The lab schedule is available on the class webpage.
- There may or may not be other be special assignments totaling no more than 40 points altogether.
- Please let me know at least one week in advance in the event of a scheduled excused absence.  Please communicate with me as soon as possible in the event of an unscheduled excused absence.  Even if your absence is not excused, please come talk with me about it.
- In general no late work will be accepted, but if you have been ill or have some other excused absence please communicate with me to arrange for alternate due dates.
- Attendance is mandatory, and will be taken daily and reported to the Associate Dean.  Each unexcused absence will lower your course point total by 8 points.  Tardiness by more than 5 minutes will be treated as an unexcused absence.  In the event that you have an excused absence please communicate with me to make sure that I know that it is excused.
- Grades will be based on the percentage of points earned:  A ≥ 93%;  90% ≤ A- ≤ 92.99%;  87% ≤ B+ ≤ 89.99%;  83% ≤ B ≤ 86.99%;  80% ≤ B- ≤ 82.99%;  77% ≤ C+ ≤ 79.99%;  73% ≤ C ≤ 76.99%;  70% ≤ C- ≤ 72.99%;  67% ≤ D+ ≤ 69.99%;  60% ≤ D ≤ 66.99%.  You can calculate your grade at any time by calculating your percentage of points earned.

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What this course promises: a deep understanding of the most important area in physics

Electricity and magnetism may seem like distant and seldom-encountered phenomena in your life. The truth is exactly the opposite. Every way that you interact with your environment involves the electromagnetic force: the force that pushes up on you in your chair and keeps things from falling through tables is an electric force; so is the friction force that allows you to walk and drive and keeps things from drifting around on tables; your muscles contract by electric stimulation; your entire nervous system is designed around the motion of electrically charged ions; all of chemistry from petroleum to batteries to household cleaners to the biochemical interactions in any living organism are governed by the electric force. Your cell phone, computer, and countless other electronic devices are built upon the principles that we will learn. Your ability to see, and the miracles of television, radio, radar, lasers, and so on, are all designed using the knowledge that light and these other radiations are electromagnetic waves.

This course promises an understanding and appreciation of the deep and elegant principles which govern almost everything that happens to you, and almost all of our technological advances. I personally promise you that I will support your journey into understanding electromagnetism in any way that I can. I will help you master both problem solving skills and a conceptual understanding of how all of these diverse phenomena fit together. Some of this help can be provided in class, but much of it will have to be done outside of class time.

How to obtain a deep understanding of electromagnetism

Your job is to do whatever it takes to understand every word in the book and in class. The ideas that you will learn will feel unfamiliar at times. You will have to work hard to understand the electromagnetic force, but I know that each of you can do it. Prepare to do all of the following:

- **Read the material in the book before it is covered in class.** Study the book carefully and do whatever it takes to understand it thoroughly. If you are left wondering what the book means in a derivation or an example or a problem, then clarify it by talking with your classmates, the tutor, or me as soon as possible.

- **Attend class and participate fully every day,** without exception. The lecture portion of the class will not be a duplication of what you find in the book. We will not cover derivations of equations or the specific examples contained in the text; you should be reading these before class. We will spend the class time becoming familiar with the concepts that he text introduces, and solving problems. You will not have a deep understanding of electromagnetism if you are not fully engaged in class each day. More importantly, you will not enjoy learning electromagnetism if you miss class or become a passive observer. Raise questions, answer questions, and strive for complete understanding every day.

- **Reflect on what you’ve done.** Every time you work a problem ask yourself, “Does this answer make sense; is it reasonable?” Every time you finish a group of problems or read a section, stop and ask yourself, “What was I supposed to get out of this? What were the big steps or ideas?” Understanding is the goal, not just calculating a number or memorizing a fact.

- **Above all, solve lots of problems every day.** You absolutely must keep up with the daily reading and solve the problems relevant for the most recent lecture before the next class meeting. The more problems you solve, the more you will feel that you have deep understanding of the subject. When you run into difficulty, first discuss your work with classmates. If the difficulty remains, come to see me or the tutor, but don’t delay. Make a promise to yourself now that you won’t fall even a little bit behind in clarifying an issue.

Extra Help

Part of learning physics is getting stuck. It’s important to learn to work independently and develop confidence in your own ability to get yourself unstuck, but you shouldn’t let frustration go on for too long. Get help! Consult with me or with your classmates after you have attempted the daily problems by yourself. Working in study groups 3 times a week can be very effective and fun, but I urge you to make an honest attempt at solving each of the problems yourself before discussing them with a study group. There will also be a tutor available for evening tutoring sessions in physics 230. Details will be provided in class as they become available.

Academic Honesty

Cheating includes copying answers on tests or assignments, glancing at nearby test papers, swapping papers, stealing, plagiarizing, and illicitly giving or receiving help on exams or assignments – in short, presenting another’s work or ideas as your own. You are expected to conduct yourself with integrity. When you cheat, or aid someone else in cheating, you violate a trust. If you are suspected of cheating, the Associate Dean will be contacted immediately to schedule a meeting with you to discuss the issue.

Homework is one area that requires additional explanation. I encourage you work with classmates on the problems after you have attempted the daily problems by yourself. It is OK to discover the solution to a problem in a group, as long as you write up the solution to the problem yourself (in your own words) and you fully understand the solution. If you obtain and submit a “solution” from another student but cannot explain it to me when asked, then you are most likely engaging in a form of cheating which will, at the very least, come back to haunt you on the exams.

Students with Special Medical Conditions or Disabilities:

If you have medical information to share with me in the event of an emergency, please contact me via email or come to see me during office hours. If you need adaptations or accommodations because of a disability, I can refer you to the College’s coordinator for disabilities, Mary Gulley (238-5223). A signed, laminated Accommodation Notice will be prepared to show professors how and when accommodation is necessary.

Your assignment after the first day of class

- **Read Chapter 23.** Note on paper any questions that you have on the reading.
- **Log in to WebAssign, change your password, and complete the first 8 problems of the Chapter 23 assignment.** Save your work.
- **Think of a some question that you have about electricity and magnetism at the start of the course.**
- **Form a homework study group with at least two other students in the class, and meet once before Friday’s class.** Discuss the assigned problems and your question mentioned on the line above.
- **You must come to see me in my office at least once before next Friday, February 12.** I will ask you what your question about electricity and magnetism is, who is in your study group, and we can discuss any special interests or concerns you have.
Details for Online Homework Submission

We will be using the WebAssign online homework tool for the collection of almost all of the homework problems in this course. (The exceptions are occasional derivations involving written answers that will be submitted to me on paper.) The online homework submission is an advantage for you because you get instant feedback on the correctness of your answers before the homework is due. If your answer is incorrect you can check your work and then seek help if necessary before resubmitting another answer. You may submit up to 10 answer attempts before the homework due date. The due date for the assignment is listed when you log in.

Logging In

To log in to WebAssign, go to [www.webassign.net/login.html](http://www.webassign.net/login.html). You will be prompted for your username, institution code, and password. The institution code is `centre`. Your username and password are the same and are formed out of your name. Here is the list of usernames/passwords:

- aleksandrova.alina
- bayse.cameron
- blum.geoffrey
- boyer.everett
- bozarth.michael
- buchanan.haley
- culbreth.chris
- effinger.amy
- freudiger.danny
- gerard.harry
- hall.sarah
- hodge.brian
- hogan.brette
- howell.molly
- howell.ryan
- howell.stephen
- juhl.rebecca
- knight.tyler
- lentz.katie
- milam.scott
- myers.david
- niehaus.emily
- polio.willie
- reynolds.rachael
- sanders.samuel
- shirley.evan
- slone.ben
- spencer.matt
- wallace.grant
- walls.heather
- ward.george
- yang.jerry

After logging in you should change your password by clicking My Options in the upper right corner.

Viewing Your Assignments

Your current assignments are listed on the Home page for our class at WebAssign. To see more details about your assignments, or to see past assignments, click My Assignments.

Working on Assignments

1. From your Home page or My Assignments page for a class, click the name of the assignment you want to work on.
2. Answer the assignment questions. See Answering Questions below.
3. Optionally you can click Save All Work so you can continue working on the assignment later. Your saved work is not scored.
4. Submit your answers. You will see the marks ✔ or ☒ to show you which questions you answered correctly and which ones you missed.
5. Submit new answers for any questions you missed.
6. A practice button may be available on some problems. This allows you to try a version of the same problem with different random numbers. After submitting an answer, you will have the option of viewing the correct answer to this problem if your submitted answer is incorrect. Once you have mastered the practice problem, you can submit a new answer for your assigned problem.

Important: Submit all of your answers before the due date and time displayed at the top of the assignment.

Answering Questions

WebAssign supports many different question types. Keep the following in mind as you answer questions in WebAssign:

- Numbers or words that are displayed in red type are randomized and might be different for your classmates.
- Questions displaying the ✠ icon require you to specify the correct number of significant figures in your answer.
- Some questions display a palette or open a new window for you to specify your answer.

For more information about answering questions, see “Answering Questions” in the Student Online Help.

Technical Support

If you cannot log in or if your class is not displayed after you log in, first confirm with me that you have the correct username, institution code, and password. For more information, or to contact technical support, see [www.webassign.net/user_support/student/](http://www.webassign.net/user_support/student/).

The WebAssign support staff cannot:

- change your username or password
- give extensions
- change your score
- give you extra submissions
- help you with the content of assignments

Please Be Patient

WebAssign is new for me and most likely for you too. Undoubtedly we will run into some hurdles at the beginning of the course, but I will help you through them and I will be understanding. My advice to you is to start the assignments as soon as they are available, so that if there are problems with the interface then we can get them cleared up before the due date comes around.

Studies have shown that students prefer online homework with instant feedback to the traditional homework collection method, so I hope that you will find it helpful. Keep me well informed about any problems that you are having.