

## PHYSICS 260: COURSE OUTLINE – Spring 2010

Essential course information for which you are responsible

**Instructor:** Prof. G. R. Grist

**Office:** 7-7320

**Office Hours:** Tu Th 1:00 – 2:00, or by appointment

**E-mail:** [gristg@smccd.edu](mailto:gristg@smccd.edu)

**Homepage:** <http://www.smccd.net/accounts/gristg/> The course webpage is linked here.

**No-Question-Too-Dumb Office Hours:** If my office hours are not convenient for you, email me or make an appointment; I am usually on campus most of the day Tuesday and Thursday.

**Course Schedule: Lecture** Tu Th, 9:35AM – 10:50AM in 8-8304

**Laboratory** Th 2:20PM – 5:00PM in 7-7305

**Course Description and Prerequisites:** This course is about electric and magnetic fields, how they are generated by electric charges and how they in turn influence the motion of electric charges. You will study the following topics: electric charge, electric fields, Gauss' Law, electric potential, capacitance, current and resistance, circuits, magnetic fields, magnetic fields due to currents, induction and inductance, magnetism of matter, electromagnetic oscillations, and alternating currents. You should have passed Physics 250 with a grade of C or better and have completed Math 252 with a grade of C or better.

**Honors Section (Section AH):** There is an honors section of this class offered concurrently. All students in the Honors Section are expected to do honors level work and will be given additional assignments throughout the semester.

**Course Goals and Student Learning Outcomes:** The goal of this course during the next sixteen weeks is to introduce you to the field of physics in general and specifically the area of electricity and magnetism. I will provide you with the basis you need for an understanding of the scientific method and a foundation in critical thinking. I want each student to walk away from this course with a new appreciation for physics and for modern scientific practices.

By the end of the term, students will...

- Exhibit a conceptual understanding of the physical laws of electricity and magnetism.
- Develop sound problem solving skills, both conceptually and quantitatively.
- Be able to conduct an experiment, collect and analyze data, and interpret results.
- Have improved skills in critical thinking.
- Be knowledgeable in the development of the physical sciences.

**Required Materials:** Text - *Fundamentals of Physics* by Halliday, Resnick, and Walker 8th Edition (an earlier edition is ok), WebAssign access code, Scientific Calculator.

**WebAssign :** Class Keys Section AX: skyline 6459 9394 Section AH: skyline 0413 8320

You will be submitting homework through the Internet and will need an access code to use the system. It comes bundled with the textbook in the bookstore or can be purchased online. If purchased separately the cost is about \$33.00 for one term, or \$50.00 together with an eBook. I determine the problem sets and quizzes, but WebAssign administers the delivery and grading. You can find more information about getting started with WebAssign in the handout.

**Course Activities:** These are designed for you to get the most out of this experience.

**Reading (Studying)** - Check the schedule at the end of the syllabus to see what is coming next. Scan the text before lecture to prime your mind, and then after the lecture read the applicable sections along with your lecture notes for full effect.

**Problem Sets** - These are online exercises that you will do on WebAssign to practice your understanding of the material. There is approximately one set for each chapter of the text. Without a doubt, the best way to learn science and do well in this course is to take the problem sets seriously. If you have trouble answering a question, review that material and try again.

**Quizzes** - There will be one online quiz given at the end of each period on WebAssign. This is for you to assess your strengths and weaknesses, which help you review and to practice for the exams. I may also give an occasional in class 'pop quiz'.

**Exams** - There will be three exams of equal weight given during the term. The last exam will occur during the scheduled "final exam" time. The last exam cannot be taken at another time. All exams are closed book, and closed notes, but a basic calculator is allowed.

**Lab Exercises** - There will be approximately one lab exercise done each week. Most lab exercises will have a worksheet with questions and a data analysis section. These will be completed and turned in at the end of that day's lab period.

**Lab Reports** - These are a formal write-up of your lab work. You will be given a defined report format due the following week. During the semester two to three will be assigned.

**Time Management:** To be successful in this course you will need to keep up with all of the assignments. Falling behind in a science course can be catastrophic! In other words, it may be almost impossible to catch up if you get behind.

**Attendance and Participation:** You are responsible for all material presented in class, including announcements about class procedures and scheduling. I will randomly take attendance. Although formal attendance will not be taken, you are urged to attend the lectures; after all, you paid for them. Besides, this is the only way for you to participate in class discussions, hear other student's questions or ask your own, participate in group work and take in-class quizzes.

**Grading:** The course grade will be based on the accumulated number of points weighted according to the following percentages:

Exams	60%
Lab Work	20%
Problem Sets and Quizzes	15%
<u>Attendance and Participation</u>	<u>5%</u>
<b>Total</b>	<b>100%</b>

Your final letter grade is based on the percentage of the total number of points, rounded to the nearest integer. I reserve the right to bump your final grade up a bit if you show marked improvement during the course. If you miss three or more labs you cannot pass the course. The cutoffs are as follows:

**A: 90%**

**B: 80%**

**C: 70%**

**D: 60%**

**Class Environment:** I try to create a class environment that is enjoyable, safe, and conducive to learning. Towards this end, it is essential that all of us show respect for one another. Specifically:

1. **Be on time for class.** You must be in your seat when the class starts. If you arrive late, please quietly enter at the rear of the room. **There will be no late seating for exams.** If you are late, you will miss that exam (see item #5 below).
2. **Be prepared for class.** Any work that is due (i.e. lab report) must be turned in before class starts. Bring any required materials (i.e. calculator) with you.
3. **Always turn off your cell-phones, PDA, etc.** If you have an emergency situation that requires you to have your phone on see me prior to class.
4. **Be respectful of others.** Do not talk during lectures. Do not interrupt another student - only one person talks at one time. No sleeping in class.
5. **No make ups.** Work that is missed (i.e. exams, labs, worksheets, quizzes, etc.), or more than two days late for due date assignments, **will be counted as zero** and cannot be made up. If you have a valid and verifiable excuse (e.g., you donated a kidney to a member of my immediate family) stop by my office and we'll talk.
6. **Do your own work.** If you turn in any work that indicates copying, you will receive a grade of zero. If you receive or give help on an examination you will receive a grade of zero. All such cases will be referred to the Dean.
7. **Smoke Free Policy.** Smoking is now restricted to designated parking lot areas.

**Special Arrangements:** If you have a verifiable condition that will make it difficult to complete the course without special arrangements, please notify me as soon as possible.

You alone are responsible for managing your life; therefore I will not drop you. The following dates (deadlines) are administered by the college. If you need to drop the course you must do so by the last day to drop. After that date I will have no choice but to assign you a grade, and that grade cannot be a **W** or, except in rare circumstances, an **I**. Students who simply disappear into the fog risk harming their GPA.

If you have concerns about your progress, let's talk. I may be able to help you find a strategy that will be successful for you.\*

### Some Important Dates - See Schedule for Others

**Feb 1:** Last day to request a refund

**Feb 16:** Last day to drop without a "W"

**March 10-12:** Flex days - No classes

**April 3-9:** Spring Break - No classes

**April 29:** Last day to drop with a "W"

**June 9:** Final grades available on WebSMART

☺ **FINAL EXAM: 8:10AM Tuesday, May 25 - Bring Coffee!** ☺

\* This is an asterisk

**Work Standards:** As a college level course there are certain expectations that you must meet in your work product. This is so that you can make yourself clearly understood, allow me to grade everyone on an even basis and so that you can develop professional standards that you will use for a lifetime. You can't be expected to do something that you are unaware of, so here is a starting point that is common to all of your assignments.

**All work turned in must meet the following standards to be graded:**

- 1. Cover sheets:** All papers turned in must include a coversheet that is clearly labeled as follows:  
*Upper right hand corner*
  - Name - First name then last or family name (i.e. Marie Curie, A. Einstein)
  - Course (PHYS 260)*Center of page*
  - Title of work (for example, *Lab #2: Electric Field Explorations*).
- 2. Staples:** Use staples to hold together multiple page assignments. Loose sheets get separated and lost, paperclips snag on other papers in the stack, and report covers make stacks unmanageable.
- 3. Paper:** Use standard 8.5 x 11 sheets. Be sure that your edges are clean (i.e. No frayed and tattered spiral binding remnants).
- 4. Neatness Counts:** Your work must be reasonably neat, legible, and readable. I expect your work to be professional, comparable to what you would turn in to your employer. Use a word processor for written material (reports). Diagrams and sketches are usually better done in pencil. When writing in ink, use a blue or black. **Red** is reserved for corrections.
- 5. Use proper English:** When answering questions, use complete sentences (i.e. answers like "yes", or "90 times" are not OK). If you have difficulty with English for any reason, please see me so we can work something out.
- 6. Late assignments:** Assignments are due at the *beginning* of class, no exceptions. It is essential for you to turn in work on time in order to be successful in this course, just as in life. Unless you have made prior arrangements with me, points on late work will be deducted according to the following schedule:
  - **First Day Late** (9:35AM until 9:35AM the next day), **20% Deduction**
  - **Second Day Late** (9:35AM the next day until 9:35AM the following day), **Half Credit**
  - **After Second Day** (past 9:35AM the following day); **No Credit!**

*A day is a business day (i.e. Monday – Friday)*

Late assignments must be given to the MESA Center to be date and time stamped to be accepted. If you leave it anywhere else (i.e. mailbox, desk, under a door) it will be lost and given no credit.

- 7. Group Work:** I encourage working together with other students. However be sure to create your own work product. Direct copying of assignments is not permitted, and is considered plagiarism, a violation of scholastic standards. See item 6 under "Class Environment".

**Specific Lecture Information:** We will cover the twelve chapters (Part 3: Ch. 21 - 32) in Halliday, Resnick and Walker. This covers electric charge and fields, Gauss' Law, electric potential, capacitance, current and resistance, circuits, magnetic fields, induction and inductance, magnetism of matter, electromagnetic oscillations, alternating currents and culminates in Maxwell's Equations! I realize that this material describes phenomena that mostly cannot be observed directly - we typically observe how it effects other things. [A mechanical example of this is the wind; you can't see the wind. but you can see it move the grass...] Much of what we will be exploring may be outside of your experience and rather abstract, but hang in there! Using a combination of good scientific principles, logical reasoning, hands on exploration, and math skills you can develop an understanding of some of the great mysteries of the universe. That will take time and effort, but it will be worth it.

**Survey:** I will be giving you a survey of general E&M topics the first week and again the last week of the course to see how we advance as a class. This will take about an hour and it will **look** like a test, but you will not be graded on it; You will however receive participation points for **doing** the survey!

**Exams and Quizzes:** I am planning on three exams worth 100 points each and with the last exam being the final. Any material that was generally missed by the class on a previous exam is fair game for the next exam. I may occasionally give a pop quiz, so stay current and be on time!

You should check your exam grade upon return. If I have made an error in adding up the points or recording the grade you will have one week to have the grade corrected. I will not change any grades after that date. No tests or quizzes will be dropped and, no makeup tests will be given.

**Problem Sets:** Problem sets will be assigned regularly and graded through an Internet site called *WebAssign*. You can find more information about getting yourself set-up and how this system works in the handout *Getting Started with WebAssign*.

One of the great things about WebAssign is that you will receive instant feedback on your answers and be able to try again up to three times for full credit on problem sets. After three tries you will have the opportunity to earn half credit if you get the problem correct, up to a total of ten attempts. Also, during the first two days after an assignment is due you can give yourself up to a one-day extension for a late assignment; But this will cost you 25% of any new answers.

Expect to spend about 2-3 hours outside of class for every one hour of lecture. Learning physics requires working problems and exercises - PRACTICE! - Just like learning to play an instrument! As you read the text, work the example problems out yourself. It is very important that you use the exercises to your best advantage. Make your goal understanding the process, not simply getting the right answer. Correct solutions without a clear understanding won't help you on the exam.

It is an excellent idea to form a study group with several other students and work homework problems together on a regular basis. You can learn from not only the successes of others but from their failures, and your own as well. Do not leave studying the material to the night before the test. Work hard, be patient, thoughtful and logical and try to understand, not to memorize.

**Specific Laboratory Information:** The laboratory exercises are a very important element of your course of study. This is where you get to interact with physics in a hands-on manner and deepen your understanding of the material through your own experience.

You will work on experiments with two or three lab partners. There is no lab manual to purchase, but either I will hand out a copy of the week's lab procedures during Tuesday's lecture or you will be able to download the appropriate files from my website. Although it is difficult to fully understand the lab procedures until you are in the lab with the equipment, it is important to spend about a half hour looking over the procedures before the lab period so you do not waste precious time trying to figure out what to do during the lab period. Occasionally I will start the lab period with a short quiz on the procedures for that day's lab, so be sure to look it over and be on time!

**The lab period** will start with a discussion of the current lab exercise, including safety instructions that must be followed. I will also cover lab procedures and protocol, scientific methodology, proper operation of lab equipment, common pitfalls and sources of error, and data analysis. It is imperative for your participation in the lab that you are part of this overview and to do that you must be on time. Individuals who arrive after significant material has been covered will be turned away for their own safety as well as the safety of others. This will unfortunately cause you to accrue a missed lab (*see the section on attendance below*).

A penalty grade will be imposed if you do not follow the safety instructions, leave the lab without checking your data with me first or without putting away your equipment.

Several of the labs will require a formal report. This report will be due at the beginning of the next laboratory period. Each lab is worth from 10 to 20 lab points based on the complexity of the lab assignment and whether it is a formal report. Labs will be graded on a scale from 5 (Excellent and insightful) to 1 (Poor) and then assigned lab points relative to this. Thus a 15 point lab graded a '4' would earn 12 lab points. Be sure to read and follow the work standards on page 4 of this syllabus.

**Lab reports** are due at the beginning of the lab period of the week following the exercise. Reports handed in after the beginning of the period will be counted as late (please see item #6, on page 4). If you do have a late lab, be sure to have your lab checked off, even if for no points, so that you do not accrue a missed lab (*see the section on attendance below*).

**Attendance** for lab is **mandatory**, as is turning in your work. You will be held to this policy without exception. Because of equipment and scheduling problems, missed labs cannot be made up. If you miss a lab because of a verifiable sickness or family emergency, see me as soon as possible for special arrangements.

1. *If you miss a lab*, you will get a zero as the grade for that lab. There is a 10 point buffer built into the lab grade, so that allows you one absence with little to no penalty in points.
2. *If you miss a second lab*, you will be stuck with a zero for that lab, which will of course lower your lab grade.
3. *If you miss a third lab*, you cannot pass the course. If you do not drop, you will be given a grade of F for the course.

**SPRING 2010 TENTATIVE SCHEDULE**

<b>Week Beginning Tuesday</b>	<b>Chapter</b>	<b>Topic</b>
19-Jan	21	Electric Charge
26-Jan	21	
2-Feb	22	Electric Field
9-Feb	23	Gauss' Law
16-Feb	24	Potentials and Fields
<b>23-Feb</b>	<b>24</b>	<b>First Exam (Charge - Gauss)</b>
2-Mar	25	Capacitance
9-Mar	26	Current and Resistance
16-Mar	26/27	Circuits
23-Mar	27	
30-Mar	28	Magnetic Fields
<b>6-Apr</b>		<b>--- Spring Break ---</b>
<b>13-Apr</b>	<b>28</b>	<b>Second Exam (Potential - DC)</b>
20-Apr	29	Magnetic Fields due to Currents
27-Apr	29/30	Induction and Inductance
4-May	30	
11-May	31	EM Oscillations and Alternating Current
18-May	32	Maxwell's Equations

**Third Exam - Tuesday, 25 May 8:10am - Bring Coffee!**