Syllabus
Physics 1304: Introduction to Electricity and Magnetism
Spring 2019

Course Webpage: http://www.physics.smu.edu/cooley/phy1304/

When/Where: Tuesdays and Thursdays 11:00 am - 12:30 pm
123 Fondren Science Building

Instructor: Dr. Jodi Cooley
151 Fondren Science Building
214-768-4687
cooley@physics.smu.edu

Teaching Assistants: TBD

Office Hours: TBD

Prerequisite: PHYS 1303 or PHYS 1307
Prerequisite or Co-requisite: MATH 1338

Course Objective:
The specific learning goals of this course are as follows. Upon successful completion of this course, students will be able to:

1. Explain the nature of electrical charge, force, potential, and fields and describe the behavior of electrical phenomena; explain the basic components of electrical circuitry, including conductors, batteries, resistors, and capacitors; explain the nature of magnetism and describe the behavior of magnetic phenomena; explain the nature of light and its connection to electricity and magnetism; explain the basic working of optical systems; explain how the study of electricity, magnetism, and light set the stage for a 20th-century revolution in our understanding of the universe;

2. Setup and solve quantitative problems in the areas described above, and thus be able to apply their understanding of electricity, magnetism, light, and optics to areas other than physics, such as medicine, biology, chemistry, electronics, and everyday life;

3. Demonstrate, through performance on homework, quizzes, in-class exercises and discussion, and exams, a clear understanding of the principles and application of electricity, magnetism, light, and optics.

Student Learning Outcomes:
Pure and Applied Sciences Level 1 [PAS1] Student Learning Outcomes:

1. Students will be able to demonstrate basic facility with the methods and approaches of scientific inquiry and problem solving.

2. Students will be able to explain how the concepts and findings of science or technology in general, or of particular sciences or technologies, shape our world.

Quantitative Reasoning [QR] Student Learning Outcomes:

1. Students will be able to develop quantitative models as related to the course subject matter.

2. Students will be able to assess the strengths and limitations of quantitative models and methods.

3. Students will be able to apply symbolic systems of representation.

4. Students will be able to test hypotheses and make recommendations or predictions based on results.

5. Students will be able to communicate and represent quantitative information or results numerically, symbolically, aurally, visually, verbally, or in writing.

Textbook:
Required: WileyPLUS Fundamentals of Physics by Halliday & Resnick (11th edition online) See course website and additional handout on information for obtaining the course learning system.

Homework: Homework will be assigned through WileyPLUS and must be submitted before 11:00 am on the due date. NO CREDIT WILL BE GIVEN FOR LATE HOMEWORK. I encourage you to discuss your work with a study group and use office hours if you have difficulty.

Exams: There will be three mid-term exams (Midterm Exam 1: Tuesday, February 18th, Midterm Exam 2: Thursday, March 12th, Midterm Exam 3: Thursday, April 9th) and a final cumulative exam (Friday, May 9th from 11:30 am - 2:30 pm.
Grading: Your course grade will be based on reading quizzes (5%) homework (10%), mini-exams (15%), midterm exams (15% each) and a cumulative final exam (25%).

University Honor Code: The student code of conduct can be found in the 2019 - 2020 Student Handbook which is available on the SMU website (**http://smu.edu/catalogs/**). All students will be expected to adhere to it. Any student found cheating or plagiarizing another's work will be given a zero for that assignment and a complaint will be filed through the Vice President for Student Affairs Office.

Disability Accommodations: Students needing academic accommodations for a disability must first register with Disability Accommodations & Success Strategies (DASS). Students can call 214-768-1470 or visit http://www.smu.edu/Provost/ALEC/DASS to begin the process. Once registered, students should then schedule an appointment with the professor as early in the semester as possible, present a DASS Accommodation Letter, and make appropriate arrangements. Please note that accommodations are not retroactive and require advance notice to implement.

Religious Observance: Religiously observant students wishing to be absent on holidays that require missing class should notify their professors in writing at the beginning of the semester, and should discuss with them, in advance, acceptable ways of making up any work missed because of the absence (https://www.smu.edu/StudentAffairs/Chaplain/ReligiousHolidays).

Excused Absences for University Extracurricular Activities: Students participating in an officially sanctioned, scheduled University extracurricular activity should be given the opportunity to make up class assignments or other graded assignments missed as a result of their participation. It is the responsibility of the student to make arrangements with the instructor prior to any missed scheduled examination or other missed assignment for making up the work. (See 2019-2020 University Undergraduate Catalogue)

Additional Information: In accordance with Texas Senate Bill 11, also known as the "campus carry" law, following consultation with entire University community SMU determined to remain a weapons-free campus. Specifically, SMU prohibits possession of weapons (either openly or in a concealed manner) on campus. For more information, please see: http://www.smu.edu/BusinessFinance/Police/Weapons_Policy.

Important Dates:
Please see the University Calendar: http://smu.edu/registrar/academic_calendar.asp

Homework Policy

PHYS 1304: Introduction to Electricity & Magnetism

Professor Jodi Cooley

This course will test your ability to not only get the correct answer to a problem but also to demonstrate that you can correctly solve a problem. The following policy provides the strict guidelines covering any written material which you submit to the instructor for grading (e.g. written solutions to homework used as a quiz problem, or any solutions written up for an in-class quiz).

As in the humanities, communication in science relies on clear, well-defined standards that enable the free flow of information between parties. My standards are designed with that free but structured flow of information in mind. If you have concerns about any of the below requirements, please discuss them with me during an office hour or by appointment.

Format

All written material submitted for grading must contain the following or will receive an automatic ZERO GRADE. Homework should be submitted on standard 8.5" x 11" paper with proper margins (1" top, bottom and sides).

- **Your full name**
- **The name of the current assignment** (e.g. Homework 1, Quiz 5, etc.)
- **The date on which the assignment is due**
- **The title of each problem requested for submission** (e.g. Ch21-Q2 or Ch22-P3) above the work associated with that problem.
- **No more than 4 solutions per page**

All written material must have the following qualities, or will receive an automatic ZERO GRADE:

- **Writing must be legible.** If the instructor/grader cannot read your work to determine your method or approach, no partial credit can be assigned. completely illegible assignment receives an automatic zero (small print, messy handwriting, etc.). You are always free to type your assignment in using Word or a similar program.
- **Writing must be coherent.** Any written answered must be provided with a clear sentence structure: subject, verb, and object. Writing must adhere to the guidelines of good English prose. Mathematical solutions must also be coherent. The equations

should flow like sentences, one building on the next with a clear path from your original equations to your final solutions. Show as many steps in your work as you can. If you provide insufficient steps to demonstrate you knew how to solve a problem, we cannot give you full credit. Answers without explanations will almost always receive low/no credit.

Solutions and Answers

The formatting of good solutions is described further below, and you can use the solutions I provide after each assignment as an example. In addition to legible and coherent solutions, the answers to solutions must have the following qualities in order to receive full credit:

- **Start with a Fundamental Equation or Principle:** You must begin your calculations with a fundamental equation or principle from your textbook or class. Derive your solution from there showing all essential steps. Any solution that does not start with a fundamental equation or principle and does not show enough work will result in loss of credit, even if the final boxed answer is correct.
- **Answers must be boxed:** The final numerical or written answer to a problem must have a clear box drawn around it. This indicates your commitment to your solution and makes it clear to the grader what you intended as your final result. Failure to box your answer, even if it is correct, will result in a loss of credit.
- **Numerical answers must have the correct units:** The importance of units cannot over over-emphasized. Satellites have crashed on Mars because somebody messed up units! Failure to put the correct units, or any units at all, next to your numerical answer will result in a loss of credit.
- **Numerical answers must have the correct significant figures:** Numbers have limitations; no number derived from measurement can be known perfectly. Applying the rules of significant figures teaches you this limitation. Failure to apply these rules correctly will result in a loss of credit.

Academic Honesty

You are encouraged to work together to solve problems on the homework (NOT EXAMS). However, you must also follow the basic guidelines of academic ethics.
Please see the bullets below for some basic guidance on this, as well as for some positive ways you can adhere to these guidelines.

- **Written solutions to problems must be your own work, and not copied from anybody else.** While you are encouraged to collaborated to solve problems and learn from one another, copying each others' work WILL NOT BE TOLERATED. This includes copying solutions from a solution manual, the internet or any other such resource. Any evidence of such behavior will result in proceedings in accord with the University Honor Code.

- **Numerical answers must be arrived at by your own work.** If evidence is obtained that suggests students in the class are sharing answers, steps will be taken in accord with the University Honor Code. Sharing of answers and failure to pursue your own solution, even based of collaboration on a problem, WILL NOT BE TOLERATED. If you work together, please follow these simple guidelines to acknowledge your positive collaboration with your peers.
- **Write the names of your collaborators at the top of your submitted work.** Acknowledging collaboration is like citing sources in a research paper; it gives credit to those who help you and whom you help, while asserting that the work submitted it still a product of your effort.
- **Work out the problems independently.** If you have arrived a solution as a group, separate from one another and each work the problem independently to see that each member of the group can follow the approach and agrees that this is the correct solution. This will also result in independent write-ups of the solution to a given problem.

Advice for Writing Good Solutions

Writing solutions is like writing an essay - you have to convince the reader that you have understood the question, applied the correct assumptions, and then demonstrate your solution with sufficient detail to defend the answer. Here, I outline some recommendations for writing high-quality solutions. Applying these guidelines will help you to focus your problem solving and communicate your understanding effectively.

1. State and Justify Your Assumptions
   - clearly state your assumptions and justify why you have chosen them. This will help your audience determine whether you have understood the question(s) being asked.

2. Show Sufficient Work To Convince Your Audience You Understand the Process
   - show enough intermediate steps that your audience is convinced you not only understand the question, you understand how to answer the question. This includes showing how you apply your assumptions, highlighting any mathematical or physical tricks needed to simplify steps in the solution, and finally clearly showing the answer. In science, **the process** is the most important means by which you demonstrate the correctness of the answer. Showing your work clearly is the most important way to show that you understood the material.

3. Comment on the Answer
   - If you are not asked to comment on the answer, but you have observed something interesting about the solution, please make a comment. This helps demonstrate that you not only understand the question but identify meaning in the answer.