PHYS 4B: Physics for Scientists and Engineers: Electricity and Magnetism
FALL 2023

| Professor | Class Time | Contact | Friday Lecture |
|---|---|---|---|
| Zuleyha Yuksek, PhD | **M - Th :** 1:30 pm - 2:20 pm<br>**Location:** MLC105, **in-person**<br><br>**Friday :** 9:30 am - 10:20 pm<br>**Location:** Zoom, **Online** | yuksekzuleyha@fhda.edu<br>(408) 864-8668<br>S Quad, S11a | **Zoom Link** is here<br><br>**Meeting ID:** 853 5531 4380<br>**Passcode:** 977950 |

**Course website**     Canvas through your De Anza portal (https://deanza.instructure.com/)

**Final Exam**     Tuesday, December 12 from 1:45 AM to 3:45 PM

*NOTE: Last day to drop a class with a "W " is November 17. If you do not drop by this date, you will get a grade according to your performance in this class at the end of the quarter.*

## Lab Sections

| Professor | Class Section (all in S17) | Contact Details |
|---|---|---|
| Zuleyha Yuksek | M: 10:30 am - 1:20 pm<br><br>Location : S17 | yuksekzuleyha@fhda.edu<br>S11a Phone: (408) 864 8668 |
| Zuleyha Yuksek | W: 10:30 am - 1:20 pm<br><br>Location : S17 | yuksekzuleyha@fhda.edu<br>S11a Phone: (408) 864 8668 |

**Description**

The general physics sequence provides a calculus-based introduction to the basic concepts of physics that form the foundation of all the natural sciences. This second sequence introduces the fundamentals of electricity and magnetism, induction, electromagnetic waves, DC and AC circuits. This course is a rigorous introduction to classical electromagnetism with its applications to science and engineering. It also requires problem solving using verbal logic, critical analysis, and mathematical models. Students investigate general scientific procedures as a quantitative interplay between experimentation and theory employing statistical methods, graphical techniques, and measurement theory.

The topics we will cover this quarter include: Electric Fields, Gauss's Law, Electric Potential, Capacitance, AC and DC Currents, Magnetic Fields, Faraday's Law, Inductance and Electromagnetic Waves.

**Prerequisites**
PHYS 4A; MATH 1C or MATH 1CH (may be taken concurrently)

**Required / Recommended Materials**
- The textbook for this course is *Physics for Scientists and Engineers* by Serway/Jewett, Vol 1, 9th Edition. The book is published by Cengage, but you could also buy the used book.
  - It is optional; however highly recommended
- You will need a reliable scientific calculator, like a TI-83. We will not do any programming with the calculator, so even a less complex version will suffice.

**Course Objectives**
- Discuss electrostatics and electric potential, and apply to solve related problems.
- Analyze resistance, capacitance, DC Circuits, and compute related quantities.
- Discuss magnetic fields and forces, and solve related problems.
- Explain electromagnetic induction and inductance, and solve related problems.
- Apply the principles of DC circuits and circuit elements to AC circuits.
- Explain electromagnetic waves.
- Analyze data using graphical, statistical, and computer-based techniques.

**Teaching Philosophy**
I will use a combination of mini-lectures and collaborative learning activities in pairs and groups (in-class discussion, problem solving, laboratory computational experiments, etc.) to help you learn the material. My role will be to facilitate your learning through discussion and in-class activities, not to have you copy down everything I say or write. The flip-side is that you have to come to class prepared, ready to discuss the material, and to participate!

**Course Format**
In-class - You will come to class by reading the material for each chapter. There will be a mini-lecture to introduce the topic at the beginning of class. Throughout the class, you will answer Think/Pair/Share questions, then do problem-solving in pairs. There will be graded class activities through the quarter. You are highly encouraged to meet outside of class with your friends to work on homework assignments in-person or by Zoom or by Canvas-Group features (Conference).

Asynchronous Work - You are expected to complete reading assignments and homework assignments outside of class time.

You are encouraged to work collaboratively with your friends on the homework assignments, but any submitted assignment must be your own.

Office Hours:  - I will be offering office hours in person in my office.

**Grading Policy**

Your final letter grade will be determined by dividing the total number of points earned (including extra credit) by the total number of possible points (excluding extra credit), multiplying by 100, and consulting the following table:

| Letter Grade | Percent Points | Letter Grade | Percent Points | Letter Grade | Percent Points |
|---|---|---|---|---|---|
| A | 93.0-100.0 | A- | 90.0-92.9 | B+ | 87.0-89.9 |
| B | 83.0-86.9 | B- | 80.0-82.9 | C+ | 77.0-79.9 |
| C | 73.0-76.9 | C | 70.0-72.9 | D+ | 67.0-69.9 |
| D | 63.0-66.9 | D- | 60.0-62.9 | F | 0-59.9 |

Your grade will be based on five major components, discussed in detail below, with the following relative weights:

| Component | Weight |
|---|---|
| Class Activities | 5% |
| Homework Assignments | 15% |
| 2 Exams ( each is 20%) | 40% |
| Lab | 15% |
| Cumulative Final Exam | 25% |
| Extra Credit Opportunities | 5% |

- **Lab:** The labs are an important component of this class; they will give you hands-on experience with designing and executing experiments, and the material covered during the lab complements what we do in class. **Remember: You must complete every lab in order to pass the lab class, and you must pass the lab in order to pass this course!**

- **Reading:** You will need to read the material before we start each chapter to be ready for the class.

- **Homework:** Homework assignments will be due approximately once per week at 11:59 pm on Sundays. The questions will be posted on Canvas. Homework must be submitted online as a pdf document before the deadline through Canvas by scanning or photographing your written work.

Late homework will only be accepted upon prior approval of the instructor. 3 days after the deadline, the solutions will be posted on Canvas and you cannot anymore submit any late HW assignments once the solutions are available.

- **Homework Submission and Grading:** Please make sure that you show all your steps. Without showing your work, you will not get credit!

*Submission Guideline:* Homework must be submitted online as a pdf document before the deadline. You will submit it on Canvas by scanning or photographing your written work.

*Uploading to Canvas:* Using the mobile app CAMScanner or an equivalent, upload your homework on Canvas. Submit only one PDF - **do not submit multiple pictures**. If you don't use CAMScanner, you can use google docs. Create a google doc and insert pics of your work. Then download the file as a pdf and use this as your submission to Canvas.

*Grading Guideline:* For each homework problem, 3 points will be awarded based on the quality of the presentation. For example, does the solution provide adequate diagrams and/or explanations of the model? Does the solution use units and vector notation correctly? Does the solution avoid doing algebra with numbers? Points will be awarded according to the following guidelines:

> 3 = great presentation
> 2 = minor presentation problems
> 1 = major presentation problems
> 0 = extremely poor presentation

*One randomly chosen problem will be graded on a 6-point scale*, with the additional 3 points awarded for accuracy. Be sure your solution starts with a general equation and any substitutions are clear. Clearly show the progression from the general equation to your solution, including intermediate math steps. The 3 points will be awarded using the following guidelines:

> 3 = good effort with correct results and reasoning
> 2 = a good effort with modest conceptual errors and/or math errors or a fair effort

with minor errors

> 1 = a very poor effort
> 0 = no effort

- **Exams:** Over the course of the quarter, there will be 2 Midterms. Review materials and more details will be provided closer to the time of the exam. This category counts for 40% of the overall course grade (each is 20%). ***Midterm exams cannot be missed or made up***

- **Final Exam:** The final exam will be a 2-hour, cumulative, closed-book/closed- notes exam. ***The final exam cannot be missed or made up.***

● **<u>Extra Credit Opportunity:</u>** Throughout the quarter, there will be different extra credit opportunities. They might be some of the class assignments, attendance, or some quizzes and more. **They are OPTIONAL.** At the end of the quarter, %5 of this part will be added on your total as BONUS POINTS!!!!

● <u>Policy on Late Work</u> : Homework assignments will be accepted after the due date, but the maximum grade will be reduced by 5% per day by a max of 3 days. *Once the solutions are posted on Canvas, you cannot anymore submit any late HW assignments.* All other assignments must be completed on time – no late work will be accepted.

**My Expectations**

I expect you to come to each class prepared, ready to discuss the material, and to be active participants in all discussions and group-based activities. In particular:

1. <u>Attendance is strongly recommended</u>— During class time, we will complete activities and practice problems that will reinforce the concepts that we are covering.  Please don't come to class if you don't feel well, but do let me know.

2. <u>Be respectful</u>—Please treat everybody as you would like to be treated. That includes respecting differences of opinion, listening attentively while others are speaking, and ensuring no discourteous interruptions or distractions (cell phones should be silenced, no texting, no browsing the web, etc.). Any disruptive behavior during class will not be tolerated. If there is disruptive behavior during the class, the student will be given a warning. If the problem persists, then the student is asked to leave the class and a disciplinary report may be in progress.

3. <u>Time management</u> —
   a. Reading should take 2–4 hours per week. Be sure to read the text before class, take notes and work through examples!
   b. Homework should take 3–5 hours per week. Be sure to start your homework early and get help if you need it from your instructors, other students, and the physics tutors.
   c. This is a challenging class, so expect to study 8–10 hours per week out of the class. If you are completing the assigned reading, applying yourself in class and lab, and completing your homework conscientiously, you won't need to put much time into preparing for the tests.

**Additional Policies & Information**

1. Academic Integrity: Each student will be held to a high standard of academic integrity. Cheating (copying) on the homework, exams, or any other assignments will result in a zero for the assignment, and may also cause you to fail the class. Keep in mind: if you feel overwhelmed by the material and assignments, or simply need additional help, come to my office hours, attend recitations and group tutoring, or get in touch with me as soon as possible.

2. Accommodations Policy: In compliance with the Americans with Disabilities Act and with Section 504 of the Rehabilitation Act, De Anza College is committed to ensuring educational access and accommodations for all its registered students. I request that any student with a documented disability needing academic adjustments or accommodations speak with me during the first two weeks of class. All discussions will remain confidential. Students with disabilities should also contact the De Anza College Disability Services Office.

3. Inclusive Classroom:  In this community, diversity is an invitation to celebrate the uniqueness of each individual, as well as the cultural differences that enrich us all. In this course, I will do my best to ensure that students from all backgrounds and perspectives will be served equitably. The diversity that students bring to this class will be viewed as a resource, strength and benefit. It is my intent to present materials and activities that are respectful and inclusive of the many identities of students in terms of gender, sexual orientation, disability, age, socioeconomic status, ethnicity, race, culture, perspective, and other background characteristics. Your suggestions about how to improve the value of diversity and inclusiveness in this course are encouraged and appreciated.

4. Reporting a Bias Incident or Sexual Misconduct:  In any case of possible bias or sexual misconduct, either in the classroom or anywhere on campus, you are encouraged to file a complaint. You should use the online form here. Any De Anza community member, who experiences or observes an incident of bias or misconduct, including faculty, staff and students, can file a report through this system. More information and resources around procedures dealing with sexual misconduct  and discrimination and harassment are available here.

5. Emergency preparedness:  In the event of a campus-wide emergency or College Closure, continue with readings and assignments according to the course schedule and as posted on Canvas. Online office hours will be established. Information regarding the status of the Colleges status and reopening schedule may be monitored on the De Anza College home page.

**Course Schedule & List of Topics**

Below is the *tentative* schedule of topics for the course.  Please refer to the canvas page for the most up-to-date schedule, reading and homework assignments, and other deadlines.

| Chapter (Serway) | Topic | Time (weeks) |
|---|---|---|
| Ch 23 | Electric Charges & Forces & Fields | 1 |
| Ch 24 | Gauss's Law | 0.5 |
| Ch 25 | The Electric Potential | 1 |
| Ch 26 | Capacitance | 0.5 |
| Ch 27 | Current & Resistance | 1 |
| Ch 28 | Direct-Current Circuits | 1 |
| Ch 29 | The Magnetic Field | 1 |
| Ch 30 | Sources of Magnetic Field | 1 |
| Ch 31 | Faraday's Law | 1 |
| Ch 32 | Electromagnetic Induction | 1 |
| Ch 33 | Alternating-Current Circuits | 1 |
| Ch 34 | Electromagnetic Waves | 1 |

**Student Learning Outcome(s):**

• Critically examine new, previously un-encountered problems, analyzing and evaluating their constituent parts, to construct and explain a logical solution utilizing, and based upon, the fundamental laws of electricity and magnetism.
• Gain confidence in taking precise and accurate scientific measurements, with their uncertainties, and then with calculations from them, analyze their meaning as relative, in an experimental context, to the verification and support of physics theories.

**Office Hours:**

      T,TH  11:00 AM     01:00 PM    In-Person    In-person