Physics 50: Preparatory Physics

De Anza College, Spring 2019

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Lecture: M/W, 5:30-7:20 PM, Room S35
Office Hours: M/W, 5-5:30 PM and 7:20-8 PM, Room S35

Course Objective

The goal of this course is to prepare you with the mindset and problem-solving skills you need to succeed in Physics 4A and beyond. We will start from some useful tools such as ***dimensional analysis*** and ***vectors*** that you will commonly use in physics courses. We will then move on to ***kinematics***, where we will study the relation between positions, displacements, velocities and accelerations. Describing physical system using calculus will be naturally introduced, but will not be an emphasis of this course. After kinematics, we will discuss some basic ***mechanics***, where forces now come into play. If time permits, we will discuss energy and linear momentum. Always remember physics is not about plug-and-chug. It's more about logical deduction, as well as inducing simple rules from observed phenomena.

Textbook

I'll post my own lecture notes and problem sets on Canvas, which may be your main study material. That being said, you should also have a textbook with you for a more comprehensive study. The text we will use in this course is ***Physics*** **by James Walker**. Any edition is fine, and you do NOT need to purchase the Mastering Physics access code. I will not give online HW assignment. You will only need vol.1 if you decide to purchase a book. If the book by Walker is too concise, I also recommend ***Fundamentals of Physics*** by **Halliday, Resnick and Walker**, which is what I used when I first learned these topics.

Some Dates

APRIL 21: Last day to drop classes for full refund or credit
APRIL 21: Last day to drop classes with no record of "W"
MAY 3: Last day to request "Pass/No Pass" for spring classes
MAY 31: Last day to drop classes with a "W"

"Homework" and Quizzes

Weekly problem sets will be given every week in the form of pdf. It will contain problems starting from the very basics (Level I) to problems with an advanced level (Level III) that I hope you can solve after taking this course. ***Problem Sets will NOT be collected*****.** Detailed solutions to the problems will not be provided but answer keys will be given so that you can check your work. If you don't know how to solve a problem, you are strongly encouraged to collaborate with other people in the class or ask me in the office hours. **Quizzes will be given on every Wednesday** unless stated otherwise. The problems on the quizzes will be the same as, or very similar to, the problems in the weekly problem sets and examples/exercises given in the lecture. The purpose of the quizzes is to give you incentive to finish problem sets on time. **No make-up quizzes, but the lowest quiz will be dropped.**

Exams

There will be two midterm exams and one cumulative final exam. In both quizzes and exams, I roughly classify problems into three levels as follow:

Level I: Basic definitions and elementary applications of a fundamental law
Level II: Derivations of important equations; more advanced applications of a fundamental law
Level III: Problems involving multiple concepts or more sophisticated problem-solving skills.

You can expect exams to have 25% of Level I problems, 45% of Level II problems, and 30% of Level III problems. The figures are only tentative and the classification is inevitably subjective. But I strive to follow this framework.

You are not allowed to bring calculators (you won't need it) nor any other electronic devices to the exam. A list of basic equations will be given with the exams. You are NOT allowed to bring your own personal notes to the exam.

Due to logistic difficulties, **no make-up exams will be given for any reason.** If you cannot take the exams due to medical conditions or other extenuating circumstances, official documents are required to make *possible* accommodations. You must take the final exam to pass the course.

You need to show your work on all quizzes and exams. Correct answers without supporting work will not receive credit. Full credit will only be given when you explicitly show the logical steps in a clear manner. Please make sure your handwriting is recognizable. I cannot give you credit if I don't understand your writing.

Questionnaires

At the beginning of the quarter I will ask you to fill out a Google form so that I can understand your academic background and why you want to take Physics 50. Throughout the semester I'll send out various questionnaires to collect feedback and comments from you. These questionnaires help me adjust my teaching method and your comments and suggestions will be very appreciated.

Study Advice

1. Studying physics takes a lot of time.
2. You need to understand derivations of important formulas to really understand the physics. In the quizzes and exams, I will ask you to derive equations.
3. Even though a list of equations will be provided on the exam, you should try not to rely on it. I do not encourage memorizing formulas. However, if you need to frequently refer to formula sheets, that's usually a sign of not being familiar with the material enough.
4. Do not randomly search for equations and manipulate them. Understand the context of a given equation; know when you can and cannot use an equation.
5. Imitation is an important process for learning physics. Study the example problems carefully and try to mimic the way of solving problems.
6. Do not leave things behind. Make sure you understand the example and exercise problems given in the lecture. If you don't understand anything I said, just ask!

I know you can succeed in this course if you attend lectures, read the lecture notes/textbook, and work on the example problems and problem sets. I look forward to a great quarter.

Grade

The letter grade of the course is based on your scores in quizzes and exams. Physics is a subject that has a steep learning curve at the beginning. To encourage perseverance, and to ameliorate the impact in case you have a bad day on the final exam, there are several weighting plans:

Default Weighting	**Alternative A**	**Alternative B**	**Alternative C**	**Alternative D**
Questionnaire 4%	Questionnaire 4%	Questionnaire 4%	Questionnaire 4%	Questionnaire 4%
Quizzes 16%	Quizzes 16%	Quizzes 16%	Quizzes 16%	Quizzes 16%
MT1 25%	MT1 5%	MT1 5%	Lower MT 15%	MT1 30%
MT2 25%	MT2 30%	MT2 10%	Higher MT 30%	MT2 30%
Final 30%	Final 45%	Final 65%	Final 30%	Final 20%

At the end of the semester, I will calculate your course grade using the five different weighting plans and choose the highest one to translate to a letter grade with the table below.

Course Grade	Letter Grade	GPA
Outstanding	A+	4.0
$\geqq 85\%$	A	4.0
$80\% \leqq x < 85\%$	A-	3.7
$76\% \leqq x < 80\%$	B+	3.3
$72\% \leqq x < 76\%$	B	3.0
$68\% \leqq x < 72\%$	B-	2.7
$64\% \leqq x < 68\%$	C+	2.3
$60\% \leqq x < 64\%$	C	2.0
$55\% \leqq x < 60\%$	D+	1.3
$50\% \leqq x < 55\%$	D	1.0

x < 50%	F	0.0

Two IMPORTANT notes:

- **You must take the final exam to pass the course**
- **You will get Alternative A, B, C and D options ONLY IF ALL of your exam scores are above 30%. Otherwise, your grade will be calculated using the default weighting.**

Tentative Schedule

Date	Day	Topics	Suggested Reading
4/8	Mon	Dimensional Analysis and Units, Vectors, Displacement and Distance	Chapt.1; 3-1~3-5 2-1
4/10	Wed	1D Kinematics: Velocity and Acceleration	2-2~2-4
4/15	Mon	1D Kinematics: Const. Velocity Motion and Const. Acceleration Motion	2-5~2-7
4/17	Wed	2D Kinematics: Projectile Motion	Chap. 4
4/22	Mon	Relative Motion; Newton's 1st and 2nd Law	3-6; 5-1~5-3
4/24	Wed	2D Kinematics: Uniform Circular Motion	6-5
4/29	Mon	Review for Midterm 1	
5/1	Wed	**Midterm 1**	
5/6	Mon	Newton's Law; Static Equilibrium (without torque)	Chap.5, 6-1~6-4
5/8	Wed	Static Equilibrium (without torque)	6-1~6-4
5/13	Mon	Force and Motion I	6-1~6-4
5/15	Wed	Force and Motion II	6-1~6-4
5/20	Mon	Work and Kinetic Energy	7-1~7-4
5/22	Wed	Work and Potential Energy, Energy Conservation	8-1~8-5
5/27	Mon	*Memorial Day*	
5/29	Wed	Solving Problems Using Energy Conservation	8-1~8-5
6/3	Mon	Review for Midterm 2	
6/5	Wed	**Midterm 2**	
6/10	Mon	Linear Momentum I: Momentum, Impulse and Momentum Conservation	9-1~9-4
6/12	Wed	Linear Momentum II: Collision	9-5~9-6
6/17	Mon	Linear Momentum III: Collision	9-5~9-6
6/19	Wed	Review	
6/24	Mon	**Final Exam**	

* **The schedule is tentative, and it may change according to the pace of the class.**

* The list of suggested readings are section numbers in *Physics* by James Walker, 5th edition.

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 mechanics.