Physics 50: Preparatory Physics

De Anza College, Winter 2020

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Lecture: Tu/Th, 5:30-7:20 PM, @ MLC105
Office Hours: Tu/Th, 7:20-7:50 PM @ MLC105

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***. We will then move on to ***1D 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 1D kinematics, we will introduce ***vectors***, a necessary tool to describe physical quantities that have directions. This is then applied to ***2D kinematics.*** After kinematics, we will consider how objects can be accelerated, this is where ***forces*** now come into play. We will also discuss ***energy***, and using energy conservation to solve problems. 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 textbook recommended by the department for Physics 50 is ***Physics*** **by James Walker.** The textbook of Physics 4A is ***Physics for Scientists and Engineers with Modern Physics*** **by Serway and Jewett.** You are ***strongly recommended*** to have one of these textbooks, any edition is fine. **Reading textbooks, studying example problems therein, and doing HW assignments is a vital way to learn physics.**

Some Dates

JANUARY 19: Last day to drop classes for full refund or credit
JANUARY 19: Last day to drop classes with no record of "W"
JANUARY 31: Last day to request "Pass/No Pass" for spring classes
FEBRUARY 28: Last day to drop classes with a "W"

These dates are for your reference only. Make sure to check campus deadlines.

"Homework" and Quizzes

HW assignments will be posted on Canvas. ***HW assignments will NOT be collected*****.** 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. Solutions to the HW assignments will be posted on Canvas, a few days after the assignment is posted. About five **quizzes will be given** throughout the quarter. The problems on the **quizzes will be based on the problems in the HW assignments and examples and 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**.

Calculators are NOT allowed in the exams (You won't need them). Equation sheets or personal notes are NOT allowed in the exams. A list of basic mathematical formulas may be provided in the exam. However, **physical formulas will NOT be provided.**

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.

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Study Advice

1. ***Studying physics takes a lot of time.*** Life is hard and you may need to work multiple hours to support yourself, or even your family, financially. If you really have to work more than 20hrs per week, I strongly encourage you to only take two technical classes (including Phys 50) in one quarter. It is better to take less classes but maintain a good GPA and really understand the material, rather than rush through the courses without fully digest the contents.
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. Physical formula sheets will NOT be provided in the exams and quizzes. I do not encourage memorizing formulas. However, if you need to refer to formula sheets, that's usually a sign of not being familiar with the material enough. You can make yourself familiar with the formulas by **repeatedly deriving important equations** and doing exercise problems. It is OK to intentionally memorize some important results and formulas, but make sure you understand the physics behind what you are trying to memorize.
4. Physics is NOT plug-and-chug. 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** and **repetition** are important processes 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**
Worksheets 8%	Worksheets 8%	Worksheets 8%	Worksheets 8%	Worksheets 8%
Quizzes 12%	Quizzes 12%	Quizzes 12%	Quizzes 12%	Quizzes 12%
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
1/7	Tue	Dimensional Analysis and Units	1.1, 1.3, 1.4
1/9	Thu	1D Kinematics: Definitions and Graphs	2.1-2.5
1/14	Tue	1D Kinematics: Definitions and Graphs (***Quiz 1)***	2.1-2.5
1/16	Thu	1D Kinematics: Constant Acceleration	2.6-2.7
1/21	Tue	Calculus in Physics 101*	2.8
1/23	Thu	Vectors	Chap.3
1/28	Tue	Review for Midterm 1 (***Quiz 2)***	
1/30	Thu	**Midterm 1**	
2/4	Tue	2D Kinematics: Displacement, Velocity & Acceleration	4.1, 4.2
2/6	Thu	2D Kinematics: Projectile Motion	4.3
2/11	Tue	2D Kinematics: Circular Motion (***Quiz 3)***	4.4
2/13	Thu	Newton's Law	5.1-5.4, 5.6
2/18	Tue	Normal Force	5.7
2/20	Thu	Tension	5.7
2/25	Tue	Spring Force; Friction (***Quiz 4)***	5.8
2/27	Thu	Work and Kinetic Energy I	7.1-7.5
3/3	Tue	Review for Midterm 2	
3/5	Thu	**Midterm 2**	
3/10	Tue	Work and Kinetic Energy II	7.1-7.5
3/12	Thu	Potential Energy	7.6-7.9
3/17	Tue	Solving Problem with Energy Conservation (***Quiz 5)***	Chap.8
3/19	Thu	Review	
3/24	Tue	**Final Exam**	

* **The schedule is tentative (including quizzes). It may change according to the pace of the class.**
* The list of suggested readings are section numbers in ***Physics for Scientists and Engineers with Modern Physics*** **by Serway and Jewett, 9th edition.**
***** Calculus is **NOT** an official course requirement of Physics 50. However, it is a natural language of physics, and learning how to describe physical system with calculus is an important skill I hope you

can start learning in Phys 50. That being said, all problems given in the exams/quizzes can be solved without calculus.

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.