| Syllabus for Concepts of General Physics (Phys 2B) | |
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| Spring 2020 | Instructor: John R. Walkup |
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## Goal

Physics 2B is an algebra-based introductory physics course consisting of chapters 15-29 in Serway and Vuille (electricity and magnetism, optics, and modern physics). You are expected to know the material of Physics 2A and will need a scientific calculator. There is a mathematical review in Appendix A of the text. There is also useful information in Chapters 1 and Section 3.1.A regarding problem solving, dimensional analysis, unit conversion, and trigonometry.

## Prerequisites

Phys 2A, or permission to register from the Department of Physics

## Further Notes

To receive full credit and secure enrollment in PHYS 2B you must register for one Lab section.

## Required Textbooks and Materials

Required purchases:

* *College Physics* by Serway and Vuille with active WebAssign account

Recommended purchases:

* Schaum’s Outline, *College Physics*

## Primary Learning Outcomes

This course is designed for non-science major undergraduate students to learn some of the most important areas in classical physics: Newtonian mechanics, thermodynamics, fluid statics, and mechanical waves. Through the course lectures, demo observations, hands-on experimental labs, and problem-solving practices and discussions, students will be able to

* describe the position, velocity, acceleration, and mechanical energy of objects,
* analyze the motions of objects and the forces acting on them using Newton’s laws
* analyze the linear and circular motions of objects using kinematic equations,
* solve mechanical problems using Newton’s laws, the kinematic equations, momentum and energy conservation laws,
* apply Newtonian mechanics on contemporary issues such as planet rotation, satellite launching, and skydiving,
* analyze thermodynamic systems using the three fundamental thermodynamic laws,
* solve problems using fundamental thermodynamics principles and properties such as temperature, heat, work, energy, thermal states and processes,
* discuss and solve practical thermodynamic systems and devices such as air conditioners, automobile engines, and thermo-electric converters,
* solve fluid problems using Pascal’s and Archimedes’ principles and Bernoulli’s equation, and
* explain wave/sound phenomena with concepts such as period, frequency, and superposition.

## Examinations and Major Assignments

### Homework

All homework is completed online through WebAssign. It is your responsibility to ensure that you have an active WebAssign account. Late homework will not be accepted. The lowest *three* homework scores will be dropped. Do not ask for an extension; *it will never be granted*.

### Exams

There will be three midterm exams and a comprehensive final (all closed-book). All exams are comprehensive and include multiple choice and free-response questions.

Cheat sheets are not necessary. All necessary formulas will be provided on the exam. No other formulas will be allowed unless derived by the student on the exam from the provided formulas.

The instructor’s grading scheme (see below) negates most of the need for make-up exams. In exceptional circumstances, written medical or legal excuses must be provided to make up a missed exam. Please let me the instructor know before the fourth day of class if you have a certified disability or handicap that needs accommodation for this class.

There will be little mystery as to what the exam content will constitute and there will be no trick questions. During the week prior to each exam, the instructor will provide a study guide and sample exams that, when combined, will provide a reasonable description for each item on the exam. (However, the instructor will leave open the possibility that a small number of “wild card” questions could appear.) Therefore, when preparing for each exam, you should have a clear understanding of what material to review and understand.

| **Scoring Breakdown** | |
| --- | --- |
| A | 90% - 100% |
| B | 80% - 89.9% |
| C | 70% - 79.9% |
| D | 60% - 69.9% |
| F | Below 60% |

### Exam Dates

* Exam 1: February 6 (multiple choice only\*)
* Exam 2: March 5
* Exam 3: April 9
* Final Exam: TBD

\* Those who fail the first exam will be asked to drop the course.

## Grades

### Attendance

Attendance is not mandatory but encouraged. However, if you are absent from class, it is your responsibility to check on announcements made while you were away. Please do not ask me to review what you missed.

### Scoring breakdown

The instructor uses a traditional scale for determining final letter grades. See the table on the right.

### Exam scoring breakdown

In terms of how exam scores count toward your final grade, the instructor has adopted an approach to grading that offers four options. Your instructor will choose the option that produces the *highest* score.

| **Grade Breakdown by Assignment** | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- |
| *Option 1* | | *Option 2* | | *Option 3* | | *Option 4* | |
| *15%* | *Exam 1* | *Discarded* | *Exam 1* | *Discarded* | *Exam 1* | *Discarded* | *Exam 1* |
| *15%* | *Exam 2* | *20%* | *Exam 2* | *Discarded* | *Exam 2* | *Discarded* | *Exam 2* |
| *20%* | *Exam 3* | *25%* | *Exam 3* | *35%* | *Exam 3* | *Discarded* | *Exam 3* |
| *20%* | *Final* | *25%* | *Final* | *35%* | *Final* | *70%* | *Final* |
| 20% | Lab | 20% | Lab | 20% | Lab | 20% | Lab |
| 10% | HW | 10% | HW | 10% | HW | 10% | HW |
| **100%** | **Total** | **100%** | **Total** | **100%** | **Total** | **100%** | **Total** |

The above mastery-learning scheme negates the need for makeup exams except for the most exceptional cases. If a student performs poorly on Exam 1, then Exam 1 will be thrown out and its point value distributed to the remaining exams. The same applies to Exam 1 and Exam 2; poor performance on both allows their points to be distributed onto Exam 3 and the Final Exam, and so on.

All exams are *comprehensive*. At some point, you will need to demonstrate proficiency across a broad range of topics to receive a reasonably high letter grade. Furthermore, points can only be distributed forward, that is, on subsequent tests (not previous ones).

If the median grade of an exam is lower than the previous exam, then all grades will be curved upward so that the medians reasonably match. However, grades will never be curved downwards.

Poor performance on exams will result in the instructor urging you to drop the course. *The instructor reserves the freedom to drop you from the course if your scores are especially egregious.*

## Grade Appeals

Although I try to be as fair as possible, there may be times in which you feel that a grade you received was lower than deserved. In such a case, you may appeal the grade by simply

* writing “Please Review” on the front page of the exam and
* writing a short paragraph (roughly 40 words) on a separate sheet of paper explaining why you think I should raise your score.

At that point, I will review the assignment once again keeping your comments in mind. Some more points to take into consideration:

* I will not entertain verbal explanations; all appeals must be in writing.
* Appeals should center only on matters of proficiency.
* Appeal decisions are final.

Generally, about a third of appeals are successful. The appeals process is designed to address *significant* instances of unfairness; I will look negatively toward continual appeals over minor quibbles.

## Tutoring

For free tutoring on campus, contact the Learning Center by calling 278-3052 or visit [www.csufresno.edu/learningcenter](http://www.csufresno.edu/learningcenter).

Many upper classmen and graduate physics majors offer private tutoring at a reasonable cost. Many offer group rates as well. If you are interested, you ask your instructor for contact information.

### Supplemental Instruction

Supplemental Instruction (SI) is provided for all students who want to improve their understanding of the material taught in this course.

SI sessions are led by a student who has already mastered the course material and has been trained to facilitate group sessions where students can meet to compare class notes, review and discuss important concepts, develop strategies for studying, and prepare for exams.

The SI leader attends this class and communicates regularly with the instructor to ensure that accurate information is given. Attendance at SI sessions is free and voluntary for any student enrolled in this course. Students may attend as many times as they choose. A session schedule will be announced in the first few weeks of class. Need more information?

Check out the Fresno State Supplemental Instruction Video at <http://youtu.be/yTLGu5TLOUI>

## Subject-to-Change Statement

This syllabus and schedule are subject to change in the event of extenuating circumstances. If you are absent from class, it is your responsibility to check on announcements made while absent.

## Cheating and Plagiarism

Cheating is the actual or attempted practice of fraudulent or deceptive acts for the purpose of improving one's grade or obtaining course credit; such acts also include assisting another student to do so. Typically, such acts occur in relation to examinations. However, it is the intent of this definition that the term 'cheating' not be limited to examination situations only, but that it include any and all actions by a student that are intended to gain an unearned academic advantage by fraudulent or deceptive means.

Plagiarism is a specific form of cheating which consists of the misuse of the published and/or unpublished works of others by misrepresenting the material (i.e., their intellectual property) so used as one's own work." Penalties for cheating and plagiarism range from a 0 or F on a particular assignment, through an F for the course, to expulsion from the university. For more information on the University's policy regarding cheating and plagiarism, refer to the Class Schedule (Legal Notices on Cheating and Plagiarism) or the University Catalog (Policies and Regulations).

## Honor Code

Members of the Fresno State academic community adhere to principles of academic integrity and mutual respect while engaged in university work and related activities. As such, you should

* understand or seek clarification about expectations for academic integrity in this course (including no cheating, plagiarism and inappropriate collaboration),
* neither give nor receive unauthorized aid on examinations or other course work that is used by the instructor as the basis of grading, and

take responsibility to monitor academic dishonesty in any form and to report it to the instructor or other appropriate official for action.

## Study Expectations

It is usually expected that students will spend approximately 2 hours of study time outside of class for every one hour in class. Since this is a 4-unit class, you should expect to study an average of 8 hours outside of class each week. Some students may need more outside study time and some less.

For free tutoring on campus, contact the [Learning Center](http://www.fresnostate.edu/learningcenter)[[1]](#footnote-1) in the Collection Level (basement level) of the Henry Madden Library. You can reach them by phone at 278-3052.

Our campus has developed [SupportNet](http://www.fresnostate.edu/studentaffairs/supportnet/)[[2]](#footnote-2) to connect students with specific campus resources promoting academic success. I have agreed to participate in this program and may refer you to it if I believe you need the services provided by SupportNet to succeed in this course.

## Students with Disabilities

Upon identifying themselves to the instructor and the university, students with disabilities will receive reasonable accommodation for learning and evaluation. For more information, contact Services to Students with Disabilities in the Henry Madden Library, Room 1202 (278-2811).

## Lab Schedule

The lab schedule for this course can be found by

1. visiting <http://fresnostate.edu/csm/physics/> and
2. selecting the appropriate link at the bottom-right of the page.

If you are repeating this course, you may be wondering if you have to repeat the lab. You can petition to have your old lab grade used by filling out the following form:

<https://docs.google.com/forms/d/e/1FAIpQLSdG9bSySFSCcmQQN_dZzProANHrARzdgEgK01JbZnUq1Uwg5w/viewform?c=0&w=1>

I do not make the decision, by the way. It is completely out of my hands.

## Policies

### Disruptive Classroom Behavior

The classroom is a special environment in which students and faculty come together to promote learning and growth. It is essential to this learning environment that respect for the rights of others seeking to learn, respect for the professionalism of the instructor, and the general goals of academic freedom are maintained. Differences of viewpoint or concerns should be expressed in terms which are supportive of the learning process, creating an environment in which students and faculty may learn to reason with clarity and compassion, to share of themselves without losing their identities, and to develop an understanding of the community in which they live. Student conduct which disrupts the learning process shall not be tolerated and may lead to disciplinary action and/or removal from class.

### Copyright Policy

Copyright laws and fair use policies protect the rights of those who have produced the material. The copy in this course has been provided for private study, scholarship, or research. Other uses may require permission from the copyright holder. The user of this work is responsible for adhering to copyright law of the U.S. (Title 17, U.S. Code). To help you familiarize yourself with copyright and fair use policies, the University encourages you to visit its [Copyright Web Page.[[3]](#footnote-3)](http://libguides.csufresno.edu/copyright)

Technology Innovations for Learning & Teaching (TILT) course web sites contain material protected by copyrights held by the instructor, other individuals or institutions. Such material is used for educational purposes in accord with copyright law and/or with permission given by the owners of the original material. You may download one copy of the materials on any single computer for non-commercial, personal, or educational purposes only, provided that you (1) do not modify it, (2) use it only for the duration of this course, and (3) include both this notice and any copyright notice originally included with the material. Beyond this use, no material from the course web site may be copied, reproduced, re-published, uploaded, posted, transmitted, or distributed in any way without the permission of the original copyright holder.

## Computers

At CSU Fresno, computers and communications links to remote resources are recognized as integral to the education and research experience. Every student is required to have his/her own computer or have other personal access to a workstation (including a modem and a printer) with all the recommended software. The minimum and recommended standards for the workstations and software, which may vary by academic major, are updated periodically and are available from Information Technology Services or the [University Bookstore](http://www.kennelbookstore.com/SiteText.aspx?id=20666).[[4]](#footnote-4) In the curriculum and class assignments, students are presumed to have 24-hour access to a computer workstation and the necessary communication links to the University's information resources.

## FAQ

Q: *If I do well on the first exam but not the second, can I throw out the second exam but keep the first?*

A: No. You can only shift points toward exams taken later in the semester. This is an inherent feature of mastery learning.

Q: *I completely bombed the first test. Should I drop?*

A: If you scored under 40%, you probably should. It depends on whether you can overcome the problems you have so far encountered. It is easy to fool oneself into thinking that problems will magically disappear, especially with a mastery-learning grading policy that throws out early bad exam grades. Pouring effort into a class in which you ultimately fail is a waste of your time and could infringe on your ability to succeed in your other courses. If you are simply unable to understand the content, then dropping the course may be in order. If you simply cannot get motivated to prepare for the first exam, why do you think that motivation will all of a sudden bubble out for the next exam?

Q: *How do I know whether I want to keep an exam score or have it thrown out?*

A: The grading tool I use automatically throws out the score if it improves your overall score. So, you do not have to make this decision.

Q: *How many As and Fs do you give out?*

A: This class is not graded on a curve. I would love it if every student earned an A and therefore receive an A. Unfortunately, that has never happened. Typically, the number of As, Bs, Cs, Ds, and Fs are fairly uniform. So, in a class of 100, usually about 20 students will get As, 20 will get Bs, etc.

Q: *How hard do I have to work in this class?*

A: That depends on your own talents and knowledge, as well as your time management and ability to work “smartly” rather than “doggedly.” This is a physics class. You will be required to work hard. Most students have rated the homework load in my class as “moderate-to-heavy” and about 10 hours per week of studying/homework. But, only a few have complained about it being excessive.

Q: *What is the best way to get a good grade?*

A: There is no substitute for understanding. Trying to remember content so as to score high on a test will work in some subjects, but not physics. Also, simply working hard won’t help much if you’re not working smart. So, here is what I suggest:

1. Take a scholarly interest in the subject matter. *Care!* It is easier to get a high grade in those subjects that interest you, so try to get interested in the subject. This is what I call “immersing yourself in the content.” And if you’re not interested in a particular topic, *get* interested!
2. Try not to reduce problem-solving to a rote algorithm. The ability to solve physics problems relies on good knowledge management, not robotic adherence to systematic steps. Success in this course requires understanding the problem in front of you, organizing what you know, selecting appropriate physics principles, and critically reflecting on your solution, not “Step 1, Step 2, Step 3…”
3. Don’t be fooled by those instances when you get a problem correct but you are not sure why. You should be able to explain to yourself why you got the answer you did. Never be content with just getting a problem correct. This holds especially true for online homework, where students often tinker with a solution until they get the problem right.
4. If you struggle with a problem and finally get it right, go back and find out why you missed it the first time and why your latest attempt was successful. Again, never be content with just getting a problem correct.
5. Don’t get obsessed over a problem. At some point, you gotta’ know when you’re licked. If you have tried to solve a problem countless times and keep missing it, move on and seek help. Success is often more about effective time management than smarts. Pouring an hour into a problem that could have been explained in five minutes is one reason why students work harder than necessary.
6. If possible, try to explain what you do to someone who is not familiar with physics, such as a sibling or parent. There is no better way to uncover holes in your understanding than trying to explain the problem to the uninformed.
7. If you know how to solve a certain problem, ask yourself, “What can the professor do to change this problem? If he does, how would that change my approach to solving it?”
8. I hand out outlines for each exam at least a week prior to the exam (and usually two weeks prior). Take them to heart. There are no tricks on my exams. I give out the outlines to help you organize the content in terms of priority. So, if the outline states that Problem 1 will ask you to add three vectors, know how to add three vectors. If you don’t know how, get help. Come Hell or high water, learn how to do each problem on the outline before the exam.
9. The university and the Physics Department both employ the services of tutors and they are almost always helpful. You have already paid for these services through your tuition, so take advantage of them. If this course offers Supplemental Instruction, take advantage of that, too. Also, there are a number of physics majors who offer private tutoring at reasonable rates. If you are struggling, it’s worth the money to hire them, so do it. Finally, I have my own office hours in which I will gladly help you any way I can.
10. Once I distribute outlines for an upcoming exam, take it to your tutor. Ask him or her to query your skills with typical examples.

1. http://www.fresnostate.edu/studentaffairs/lrc/ [↑](#footnote-ref-1)
2. http://www.fresnostate.edu/studentaffairs/supportnet/ [↑](#footnote-ref-2)
3. http://libguides.csufresno.edu/copyright [↑](#footnote-ref-3)
4. http://www.kennelbookstore.com [↑](#footnote-ref-4)