

California State University, Chico
Department of Physics

PHYS 202A, General Physics I, Section 06, Spring 2019

Instructor:	David Brookes
Learning Assistants:	Joseph Arballo, Robin Kropholler, Sarena Shaw, Austin Pollard
Supplemental Instruction:	Angel Rodriguez, times TBA
Office location:	PHSC 120
Telephone:	530-898-5360
E-mail:	dbrookes@csuchico.edu
Office hours:	In PHSC 110. Times TBA
Class days and times	Tuesday, Thursday 12:30 – 1:45pm
Classroom:	ARTS 111
Prerequisites:	Algebra and Trigonometry

Course Usage of Blackboard Learn

Copies of the course syllabus and major assignments may be found on Blackboard Learn. You are responsible for regularly checking the online resources, which is accessed through the [Chico State Portal](#), or directly at learn.csuchico.edu. All course information, homework, grades, and additional resources will be posted there. For example, every week I will post feedback help for exam and homework questions that you struggled with. I simply cannot write detailed feedback on the paper of every member of a class of 96 students. The resources you need to help you learn will be there. Please make use of them!

Course Description and Goals

This course will be very different from the regular sciences classes you may have had in the past. Discussion and lab are fully integrated with each other with very little formal lecturing. Can you learn to play tennis by *only* watching somebody else play? No? Then why would physics be any different? The best way to learn physics is by *doing* and *practicing* physics. In my class you will have the opportunity to do what research physicists do. There is a lot of hard work involved, both inside the class and outside of class-time. And you are expected to do all the work! Everyone who is willing to learn and put in the effort to work on all aspects of the class has a good chance to succeed in the class.

This course will emphasize the essential connection between theory and experiment. We will be spending time investigating phenomena, developing models that explain those phenomena (this involves proposing hypotheses, testing hypotheses by predicting the outcome of a suggested testing experiment using the proposed hypothesis to make the prediction), and learning to apply the physical ideas we've developed to real world

situations. You are responsible for your own learning. You will have to think, and perform hands-on tasks during discussion and lab. We will guide you through those activities and provide you with constructive feedback to help you learn. For most activities, you will work in a group of four. The lab portion of the course is integrated into the class activities since experimentation is an integral part of how physicists generate their knowledge and understanding of the world. Please refer to the Course Strategy Guide to get a better picture of what the course is all about.

Student Learning Outcomes

Upon successful completion of this course, students will be able to:

1. To understand some fundamental ideas of physics. This includes
 - a) reconciling every day experiences with the material learned in the course, making sure that new ideas make sense, and connecting what is learned in class today to what was learned previously; (Evaluated in journals, and conceptual questions on exams)
 - b) using and consistently coordinating a variety of representations (linguistic, mathematical, pictorial and graphical) to achieve a deeper understanding; (Rubric A)
 - c) applying physics ideas to solve real-world problems through experimentation and/or calculation; and (Rubric D)
 - d) clearly communicating ideas to others. (Rubric F)
2. To learn the processes and tools of science. This includes
 - a) becoming familiar with how physics develops - where decisions are made on the basis of evidence and conjecture, as opposed to a collection of true ideas/unchanging facts that scientists somehow devise; (Rubrics B & C)
 - b) learning to evaluate ideas and information using evidence and scientific strategies to build arguments; (Rubric E)
 - c) learning to formulate physics questions, design plans/experiments to answer them and be able to conduct investigations; (Rubrics B & C)
 - d) learning to appropriately analyze and interpret experimental data. (Rubric G)
3. To learn that physics **IS NOT** about memorizing equations and plugging in numbers to get the right answer. It is about observing, explaining, and representing the physical world. It is about doing physics, not about getting the right numerical answer.
4. To be successful in this course and to be prepared for your future career.

Required Text

Textbook

The textbook for this course is

Etkina, E., Planinsic, G., & Van Heuvelen, A. (2018). *College Physics: Explore and Apply* (2nd ed.). Pearson. ISBN: 978-0-13-460182-3

The textbook is *required*. Note: There is a first and a second edition. I am going to reference *both* editions for weekly reading assignments, so it is okay to purchase a second-hand copy of the first edition. To save money you can purchase a used copy or e-text (these are the cheapest options). I will NOT be using mastering physics, learning catalytics or anything else that comes bundled with the textbook. If you want to save money, DO NOT purchase a "textbook bundle", *only* purchase the stand-alone textbook. I have a few copies of the textbook that I will loan out in cases of *dire* financial need. Please ask me if you want to make use of that option.

Classroom Protocol

The key to success in this course is collaborating and participating in discussion activities. Typically, the students who get A's in my course are the ones who use the class time in a productive way: a. They put their cellphones away & minimize other distractions. b. They try to figure things out even though they may initially be confused. c. They get to work on the activity immediately without delay. d. They talk with each other, resolving difficulties and things that are unclear.

Dropping and Adding

You may drop without obtaining permission until Friday, February 1. From February 1 to February 15, you must obtain permission from the instructor to drop. After Friday, February 15, you will need a "serious and compelling" reason to drop. Your request must be approved by the Department Chair and the College Dean.

You are responsible for understanding the policies and procedures about add/drops, academic renewal, etc., found in the [CSU Chico University Catalog](#). You should be aware of the deadlines and penalties for adding and dropping classes.

Assignments and Grading Policy

The way this class will be graded is somewhat unusual, so please take time to familiarize yourself with the system. Many activities in this class will be graded on a pass/fail system and you will accumulate points towards your final grade based on how many things you pass or fail. (How this works in exams, homework, labs, reading quizzes and journals is elaborated below.) Your grade will be determined by the number of points you accumulate through the semester.

Individual Exams

You will take 6 individual exams through the semester. You should refer to the schedule to see when these will take place. Each exam will consist of two questions: One "**core**" question and one "**advanced**" question. Each question will test a set of scientific reasoning abilities that will be clearly labeled on the exam question. The full list of rubrics are available on blackboard. Every question will be graded pass/fail. You must show adequate evidence of competence on each of the scientific abilities listed for that question. If you don't adequately meet all the listed criteria, your attempt is marked "fail." Each core question you pass counts 4 points, each advanced question you pass counts 5 points. Points are additive. In other words, if you pass both the core and advanced, you get 9 points. You may make 2 additional attempts at each individual exam to improve your points standing. The first redo occurs in the following exam slot. In other words, exam 1 redos happen in addition to exam 2 during the exam 2 timeslot. The third (and final) attempt for all 6 exams will happen during the final exam time.

Group Exams

There will be three group exams. The primary goal of the group exam is to challenge you to learn something new and challenging as a group and as a class. During the group exam you will hand in one write-up per group of 4 and group members will all get the same grade. You may cooperate with anyone in the class and may use any resources at your disposal (books, the internet etc.).

Homework

There are 13 homework assignments. Each of the 13 homework assignments will consist of 2 written questions that may be hand-written or typed and handed in on Thursdays at the start of class. Each question will be graded pass/fail. Each question you pass earns you 1 point. Just like exam questions, each question will test a set of scientific reasoning abilities that will be clearly labeled on the question. You must show adequate evidence of competence on each of the scientific abilities listed for that question. If you don't adequately meet all the listed criteria, your attempt is marked "fail."

If you want to achieve a pass on a homework question(s) you failed, you may redo the question(s). The redone questions are due the following Thursday. For example, homework 1 is due on Thursday week 2. The homework will be returned on Tuesday. The redone homework is due on Thursday of week 3. You get one chance to redo and improve your homework grade.

Homework redo guidelines:

1. You can only redo homework questions if a. you handed in your homework on time. Late homework will be graded (up to 1 week late), but does not get an option to be redone. b. You must have attempted the question that you want to redo it.
2. Any question that you redo, must be redone from scratch. That is, the solution should be completely rewritten on a separate piece of paper. It doesn't matter how close you were to passing.
3. The original homework *must* be attached *behind* the redo. Without the original, the redo will not be graded.

Oral restitution for Individual Exams and Homework

If a particular question (exam or homework) has n rubric items on it (n is typically 3 to 5 items) and you achieve passes on $n-1$ of the items, but are marked "F" (fail) on one single rubric item, you may demonstrate verbally to the course instructor that you understand what you did wrong and how to do it correctly. This will take place during office hours. If you convince the instructor you understand what you did wrong/missed and how you'd fix it, your grade will be changed to a "pass". In participating in this, you agree to abide by the instructor's final decision.

Labs

Experimentation is the heart and soul of this course. The details of how experimentation in this course fits into the overall logic of scientific reasoning can be found in the course strategy guide which can be downloaded from the course blackboard website. Every week you will be asked to design experiments to a. gather data to explore some sort of relationship between physical quantities, b. test one or more explanations you have developed, or c. apply your knowledge to solve a real-world problem. Through engaging in this continually repeating process of designing experiments for specific scientific purposes, you will develop a number of scientific abilities or habits of mind. These are scientific habits of mind that we believe you will find useful in ANY future scientific career that you choose to pursue. The full list of scientific abilities that we hope you'll develop in the course is encoded in the Scientific Abilities Rubrics that are available for download on the course website, and are in your lab manual. Take a look at them, the list is long, and a lot of thought has gone into creating that list.

The purpose of having you write up and hand in a lab report each week is for your lab instructor to assess how those abilities are developing and to give you feedback so that

you can improve and develop those skills through the semester. We will look for evidence of those scientific abilities in other contexts such as the exams.

Grading:

Each week lab activities will be written up and handed in as a lab report that is due by Friday 5pm. You will submit your report through Google docs. Pairs of students hand in one report and will get the same grade for the report. **If you were absent for lab, you are required to make up the lab in another section and hand in your own individual report.** The lab report will be graded on 7 preselected rubric items that are worth 3 points each and an additional 3 points for responding to the “why did we do this lab” questions. That is a total of 24 points. Your lab instructor will mark the grades on the rubric. Note: Labs earn points as follows: A grade of 18/24 or higher on the rubric earns 2 points. A grade from 12/24 – 17/24 earns 1 point. 11/24 or lower earns 0 points.

Weekly journal

The purpose of the weekly journal is two-fold. 1. It allows you to reflect on what you have learned every week and ask questions about things you didn't understand in a more private setting. (If you are struggling with anything in the course, question 2 is where you get to ask me. I will respond to you directly or devise an in-class activity to review a difficult concept.) 2. The weekly journal allows me to gauge your learning progress and to adjust classroom activities and discussions accordingly. For example, if it becomes clear that the majority of the class have not understood a critical idea from the previous week, I will devote more class time to review and discuss that critical idea.

How it works

Every week you will write a journal on your learning for the week by answering the questions. Sometimes there are two questions, sometimes there are more. The journal is submitted through the course blackboard website. Journals are due every week by midnight on Thursday. The journal may be redone once, the redo is due by midnight on Friday. You should check blackboard on Friday before midnight to see if your journal was returned with comments so you can resubmit.

Grading

Weekly journals are graded pass/fail (1 point). You will pass as long as you are diligent and respond to the prompts. Remember, the weekly journal helps me to plan class activities for the week, so I need your previous week's journal before the start of the next week.

Discussion

Discussion attendance is mandatory. The idea behind this course is that – by engaging in the practices of physics – you will construct scientific ideas. The emphasis is on the process. This means that you cannot miss a day and simply look up the material that was covered, you need to be actively engaged in the inquiry process. You will receive a participation grade. Every discussion, your group of 4 will submit photographs of all of your whiteboards via google docs uploaded to your group folder. The names of all PRESENT group members MUST be on the whiteboard. The whiteboard will be graded for completeness. I.e., you must put your ideas on the whiteboard even if you're struggling!

Reading quizzes

There will be 13 readings and a quiz associated with each in Blackboard. Reading quizzes will be due by Friday 5pm and **sometimes on Tuesday at 5pm**. The deadlines are clearly indicated in Blackboard – always check! Each quiz is worth 1 point.

Summary of class activities and how they're graded

Item	#	Description and Grading Scheme	Can it be redone?	Pnts per item	Max Pnts
Homework	13	2 written questions, graded pass/fail on a set of rubric items, 1 point for each question you pass.	Yes. 1 redo, due 1 week after first attempt.	2	26
Journals	15	Respond adequately to 3 reflection prompts. Graded pass/fail, 1 or 0 points total.	Yes. 1 redo. Journal due Thursday midnight. Retries due Friday midnight.	1	15
Individual Exams	6	Core and Advanced, graded pass/fail on a set of rubric items. Each core worth 4 pnts, each advanced worth 5 pnts.	Yes. 2 additional attempts. 2nd try during designated "redo" time, 3rd and final attempt in final exam slot.	4/5	54
Group Exams	3	10 points, graded on rubrics.	No. All group members get same grade.	10	30
Labs	15	Graded on 8 0-3 scale rubric items. 18/24 or greater = 2 pnts, 12/24-17/24 = 1 pnt. Less than 12/24 = 0	No. Pairs of group members get same grade unless eval. procedure is implemented.	2	30
Reading Quizzes	13	Several questions on reading, graded out of a total of 1 point	Yes. You can try the reading quiz 3 times. Grade is awarded based on final attempt.	1	13
Participation	15	Submit pictures of your whiteboards (with names of those present written clearly on the board) every week to your Google drive folder.	No.	1	15

Max possible points = 183

Final Grade Boundaries Summary

F	D	D+	C-	C	C+	B-	B	B+	A-	A
<100	100-103	104-113	114-115	116-123	124-134	135-141	142-148	149-157	158-163	164 & >

Your final course grade is absolute scale, not a relative one. That means *every* student can get an A if they so choose. There is *no curve*. I believe grading on a curve is a crime against learning because it rewards/punishes you based on how much better/worse you did relative to your peers. In this class, the goal is for you to master scientific reasoning and to learn. The grading scheme is designed to reward real, deep learning and understanding.

Missed work/excused absence policy

You are being graded on an absolute scale and not a percentage grade. In other words, when you reach 116 points, you have a C in the course. You do not have to maintain an average grade. When you get to whatever your desired grade is, you can stop working if you so choose. It also means that I don't give excused absences unless the circumstances are extremely compelling. The grade boundaries listed below have all been calculated assuming you miss at least 1 of each item. In addition, you have the option to redo many things. So, if you miss something, you will get a zero and can reclaim the points on the redo. If you miss something because of a serious and compelling reason, you must still give me documentation and I will keep a record of it. If you miss something twice for a serious and compelling reason, I will adjust your grade boundary. This is evaluated on a case by case basis at the discretion of the instructor.

University Policies and Campus Resources

Academic Integrity

While collaboration and communication are essential to succeeding in this course, external communication on exams or plagiarizing the homework of another (i.e., verbatim copying) constitutes cheating and will result in failure of this course and further disciplinary action if judged appropriate. Students are expected to be familiar with the University's Academic Integrity Policy. Your own commitment to learning, as evidenced by your enrollment at California State University, Chico, and the University's Academic Integrity Policy requires you to be honest in all your academic course work. Faculty members are required to report all infractions to Student Conduct, Rights and Responsibilities. The policy on academic integrity and other resources related to student conduct can be found on the [Student Conduct, Rights and Responsibilities web site](#).

Cellphones and other electronic devices during exams

The only electronic device you are allowed to have during an individual exam is your calculator. ALL other electronic devices MUST be put away IN YOUR BAG and NEVER come out during the exam. Any violation of this rule will be immediately referred to Student Conduct, Rights and Responsibilities and you will be given a zero for that particular exam. If you forgot your calculator, ask me to borrow one, NEVER pull out your cellphone. This rule is very strict and applies to any visual evidence (observed by me) of an electronic device other than your calculator during the exam time. I feel I need to make the logic clear here: a. However rare it may be, it is almost impossible for me to catch actual cheating in the act, b. There is no reason to have an electronic device out in the open. Therefore, if I see an electronic device I'm going to assume it is being used for nefarious purposes by default, no matter where it is positioned or whether you are actively using it or not. The solution is simple: Turn off your electronic device(s), put them in your bag and leave them there.

IT Support Services

Computer labs for student use are located on the first and fourth floor of the Meriam Library, Room 116 and 450, Tehama Hall Room 131, and the Bell Memorial Union (BMU) basement. You can get help using your computer from IT Support Services; contact them through the [ITSS web site](#). Additional labs may be available to students in your department or college.

Student Services

Student services are designed to assist students in the development of their full academic potential and to motivate them to become self-directed learners. Students can find support for services such as skills assessment, individual or group tutorials, subject advising, learning assistance, summer academic preparation and basic skills development. Student services information can be found on the [current students page of the CSU Chico web site](#). If you need course adaptations or accommodations because of a disability or chronic illness, or if you need to make special arrangements in case the building must be evacuated, please make an appointment with me as soon as possible, or see me during office hours. Please also contact Accessibility Resource Center (ARC) as they are the designated department responsible for approving and coordinating reasonable accommodations and services for students with disabilities. ARC will help you understand your rights and responsibilities under the Americans with Disabilities Act and provide you further assistance with requesting and arranging accommodations.

[Accessibility Resource Center](#)

530-898-5959

Student Services Center 170

arcdept@csuchico.edu

Blackboard ALLY

Chico State is committed to providing you the best learning experience possible. With this goal we have activated Blackboard ALLY in your courses. ALLY is a revolutionary product that focuses on making digital course content more accessible to all students. You will now be able to download any content in this course in the format that fits best with your needs. PDF, HTML, .EPUB and Audio files are now available for most content items. Here is a link to more [information on formats available](#) as well as what each format offers. Should you have any questions or experience issues while using ALLY please contact the Office of Accessible Technology and Services at oats@csuchico.edu or 530-898-6532.

PHYS 202A Course Schedule

Wk	Tuesday discussion		Lab (Tues/Wed)	Thursday discussion	
1	Jan 22 Introduction	2 nd ed. Ch. 1	Lab 1. Force and motion	Jan 24 Group Exam 1	
2	Jan 29 1-d motion	1 st ed. 1.1-1.5; 2 nd ed. 2.1-2.2, 2.4-2.6	Lab 2. Motion in 1 dimension I	Jan 31 Exam 1; HW1 due	
3	Feb 5 1-d motion	1 st ed. 1.6-1.9; 2 nd ed. 2.7-2.9	Lab 3. Motion in 1 dimension II	Feb 7 2-d motion HW2, HW1 redo due	1 st ed. Appndx B & 3.5; 2 nd ed. 2.3 & 4.5
4	Feb 12 2-d motion	1 st ed. Appndx B & 3.5; 2 nd ed. 2.3 & 4.5	Lab 4. Launch ball into the bin	Feb 14 Exam 2; HW3, HW2 redo due	
5	Feb 19 Newton's laws	1 st ed.: 2.1-2.6; 2 nd ed.: 3.1-3.5	Lab 5. Exploring Interactions	Feb 21 Newton HW4, HW3 redo due	1 st ed.: 2.7-2.10; 2 nd ed.: 3.6-3.9
6	Feb 26 Newton	1 st ed.: Ch 3; 2 nd ed.: Ch 4.	Lab 6. Measuring friction	Feb 28 HW5, HW4 redo due Group Exam 2	
7	Mar 5 Circular motion	1 st ed.: 4.1-4.3; 2 nd ed.: 5.1-5.3.	Lab 7. Circular motion	Mar 7 Circular HW6, HW5 redo due	1 st ed.: 4.4; 2 nd ed.: 5.4.
8	Mar 12 Torque, Statics	1 st ed. 7.1-7.3; 2 nd ed. 8.1-8.3.	Lab 8. Statics	Mar 14 Exam 3; HW7, HW6 redo due	
9	March 16 – 24 Spring Break. No classes.				
10	Mar 26 Torque, Statics	1 st ed. 7.5-7.7; 2 nd ed. 8.5-8.6.	Lab 9. Inventing a new quantity	Mar 28 Momentum HW8, HW7 redo due	1 st ed. 5.1-5.4; 2 nd ed. 6.1-6.4.
11	Apr 2 Momentum	1 st ed. 5.5; 2 nd ed. 6.5.	Lab 10. Intro. to energy	Apr 4 Exam 4; HW9, HW8 redo due	
12	Apr 9 Energy	1 st ed. 6.1-6.6; 2 nd ed. 7.1-7.6.	Lab 11. Physics of toys	Apr 11 Energy HW10, HW9 redo due	
13	Apr 16 Energy	1 st ed. 6.7; 2 nd ed. 7.7.	Lab 12. Measure kinetic friction	Apr 18 Group Exam 3; HW11, HW10 redo due	
14	Apr 23 Vibrations	1 st ed. 19.1-19.5; 2 nd ed. 10.1-10.4.	Lab 13. Vibrations	Apr 25 Exam 5; HW12, HW11 redo due	
15	Apr 30 Mechanical waves	1 st ed. 20.1; 2 nd ed. 11.1.	Lab 14. Mechanical waves	May 2 Mechanical waves HW13, HW12 redo due	
16	May 7 Standing waves	1 st ed. 20.2-20.3, 20.5-20.6, 20.9; 2 nd ed. 11.2-11.3, 11.5-11.6, 11.8.	Lab 15. Standing waves	May 9 Exam 6 HW13 redo due	
17	Exam week: Final exam Tuesday May 14, 2:00 – 3:50pm ARTS 111		NO LAB	Exam week	