

PHYS 7B-002: Introductory Physics

Spring 2022 Nathan Lowhorn

My name is Dr. Lowhorn (pronouns: he/him/his) and I would like to welcome you to my Physics 7B class! My purpose as the instructor is not only to teach you some physics but also to help you develop some skills like thinking critically, acquiring a logical thought process, and focusing on the concepts more than applying some recipes. As students, it is crucial to realize that your academic performance is enhanced if you cultivate the following mindset: curiosity, desire to learn, tenacity and interactions with your peers.

Important notes

As you know, all aspects of this course (lectures, discussions, and office hours) will be taught remotely for the first two weeks of the semester. Lectures and discussions will be delivered synchronously to encourage students' participation, but attendance is mandatory in discussion until 1/28.

Please note that all times in this document (and for the class as a whole) are listed in Pacific time. If you are in a different time zone, it is your responsibility to ensure that you properly convert each time to your local one.

Unless announced otherwise, the instruction format will switch to fully in-person starting on Jan. 31.

Contact/Office Hours

Instructor: **Nathan Lowhorn** nlowhorn@berkeley.edu

Office hours: Days and times TBA

weeks 1&2: <https://berkeley.zoom.us/my/lowhorn>

weeks 3-14: Location TBA

Head GSI: **Joy Carpio**, enrjoycarpio@berkeley.edu

First two weeks: *The early-drop deadline still holds, so you are expected to attend all your discussions during the first two weeks of class to remain enrolled, including those scheduled before the first lecture. **If you are unable to attend because of time zone or medical issues, please contact your GSI and the HGSI to let them know.***

*If, on the contrary, you want to drop the class, it is YOUR responsibility to do it before the drop deadline, otherwise you will have to complete the course. **The Drop Deadline is Friday 1/28.** Please contact Anna Hilke <ahilke@berkeley.edu> in Student Services (368 Physics North) for more detailed enrollment information.*

Course website

Once you are registered in the class, you should have access to the course website on bCourses (<https://bcourses.berkeley.edu/>). The site will contain all course information throughout the semester. Make sure your email address is correct as all course communications will be distributed through bCourses mailings. It is your responsibility to check for announcements regularly in order to ensure that you do not miss any important information.

7B Course Center: 107 Physics South

Additional help is available through the Student Learning Center (Golden Bear Center), the Honors Society, the Society of Physics Students, and the Physics Scholars Program. Inquire in the Physics Department Undergraduate Student Services Office (368 Physics North) for further information.

Attendance Policy

Your attendance and active participation in all parts of the course is expected. You are responsible for all information presented in lectures, D/L sections and HW assignments.

Assignments/Grading Procedures

Grades will be determined from a weighting of all the elements as follows:

- Labs 8%
- Homework 10%
- Midterm 1 24%
- Midterm 2 24%
- Final Exam 34%

Your numerical score will be used to assign a course letter grade for the class, with two exceptions discussed below. The mapping of ranges of numerical scores to letter grades (A,B,C,D,F) will reflect our judgment as to what percentages correspond to various degrees of demonstrated performance and learning, based on our overall assessment of all assignments, their difficulty, and their weights.

When taking a class pass/no-pass (P/NP), a *P* grade corresponds to the equivalent of a *C-* grade or above. Out of the desire to maintain the high standards for education at the University of California, and fairness and meaningfulness of grades, the University and Physics Department have established "strongly recommended" guidelines for the distribution of A's, B's, and C's in any one course. For lower-division, non-honors courses like Physics 8B, the recommendations are as follows: 25% A+/A/A-, 40% B+/B/B-, and 35% C+ or below. Note that the letter grade will only be assigned at the very end of the semester, after calculating the weighted average.

A course grade of "Incomplete" will only be considered under circumstances beyond a student's control, and only when these circumstances have prevented the student from completing certain assignments – not just because performance suffered – and then, according to official university policy, only when work already completed is of at least "C" quality or better.

Class Start Time

This class follows "Berkeley Time" so lecture starts promptly at 2:10pm.

Required materials and readings

- **Textbook:** D.C. Giancoli, *Physics for Scientists and Engineers with Modern Physics* (custom edition), Volume 2, 4th edition
- **Lab manual/Workbook:** *Physics 7B Student Workbook*
- **Homework platform:** *Mastering Physics* (course ID: lowhorn35759)

They can be purchased, either individually or as a bundle, at <https://calstudentstore.berkeley.edu/textbooks?section-ids=360475>

Reading the textbook and working problems is very important. Be prepared for lecture and section by reading the assigned material in advance. Lectures and sections both assume that some of the basic material has been learned from the text already.

Lectures

For the first two weeks, lectures will be delivered synchronously via Zoom using the following link at the officially scheduled lecture time (starting at Berkeley time):

<https://berkeley.zoom.us/j/96463310731?pwd=Mmx4SGhabEVVUjFzaUlINU9JK2RxUT09>

Starting on Jan.31, the lectures will be delivered in person in Physics 1.

You are strongly encouraged to attend so that you can ask questions in real time.

If you are not able to attend lecture in real time and have questions, you are strongly encouraged to attend office hours.

Lectures are meant to present the course material but that doesn't mean that you should be passively taking notes without thinking. I therefore recommend that you read the material beforehand, and I encourage you to ask questions during lectures! Because of the amount of material that needs to be covered, the number of examples

covered in lecture will be limited, so discussion/lab meetings and homework are essential to your understanding of the material.

Discussions

You must be registered in DIS and LAB sections with the same number (e.g. DIS 103 & LAB 103). Some D/L meetings will be discussions (most of them), and some (only 5) will be laboratory sessions; but no matter what, the sections always meet twice a week for two hours. **You must attend ALL your registered D/L sections during the first 2 weeks or you may be dropped from the course.**

Like the lectures, discussions will be delivered remotely for the first 2 weeks of the semester, and parts of them will be recorded to allow you to keep up with the coursework in case you are unable to attend synchronously.

If you wish to change discussion sections, you have to make an official change through Calcentral. If you cannot find any available spot, you can seek someone in the class with whom to switch by going to the "Discussions" tab on bCourses. Put your request in the subject line – "From Section 1xx to Section 1yy", (state the sections you wish to swap) and your email address. If you find a match, coordinate so each of you simultaneously drops your D/L section on Calcentral and immediately signs up for the other one.

Attending D/L sections plays a huge part in your understanding of the material, as sections provide an opportunity to work in smaller groups, ask more/deeper questions, discuss areas you are uncertain of, and improve your problem-solving and writing skills.

Labs and Lab Make-ups

Labs are worth 8% of your total course grade. As shown on the weekly schedule at the end of this document, you will have 5 labs scheduled throughout the semester. If you miss a lab session, you must make it up in another lab section that week and turn it in to your GSI at the next meeting. **Note that ALL the labs are mandatory, and there will be no make-ups at the end of the semester.** Because the Physics Department takes seriously the classification of this class as laboratory-based, **your grade in the class will be reduced by 1/3 of a letter grade if you miss 1 lab, and you will get an incomplete grade if you have more than 1 unexcused lab.**

Homework

HW assignments are worth 10% of your total course grade. They will be due on a weekly basis to help you review the material covered in class during the previous week. The problem sets will be assigned via the online platform Mastering Physics (**course ID:** lowhorn35759). Since my focus is more on the concepts than on numerical values, I will try to assign symbolic problems, as much as possible. **Each HW assignment will be due on Friday at 8:00 pm.** Working on homework problems is key to your in-depth understanding of the course material. For each HW problem, I encourage you to write down neat and detailed solutions in a notebook, working with symbols instead of numbers in a logical and organized manner, as expected on an exam. Your HW grade will be calculated after dropping the 2 lowest scores.

Exams

There will be 2 midterm examinations and a final examination on

Thursday, Feb.24, 7-9pm, Wheeler 150

Tuesday, Mar.29, 7-9pm, Wheeler 150

Monday, May 9, 11:30am-2:30pm, TBD

A Cal ID with your picture is required at all exams. More details regarding what you will be allowed to bring will be posted before each exam.

Weekly Schedule

See the last page of this document

Links to University Services

In the event of personal issues affecting your academic performance or if you are falling behind, PLEASE talk to me (or Joy) as soon as possible.

There are many resources available to help you, so we strongly encourage you to take advantage of them. Also, keep in mind that working with your peers and providing explanations to other students is an excellent way of improving your understanding of the course material.

- *Academic Calendar and Student Accommodations - Campus Policies and Guidelines* <http://teaching.berkeley.edu/academic-calendar-and-student-accommodations-campus-policies-and-guidelines> Should an exam or deadline fall on a cultural or religious holiday, and you wish to seek an accommodation, please email the Head GSI with your name, and discussion/lab number with ample advance notice.
- *Disabled Student Services* <http://dsp.berkeley.edu/> DSP serves currently enrolled UC Berkeley students with documented disabilities seeking undergraduate and graduate degrees. If you have a disability, or think you may have a disability, you can work with DSP to request an official accommodation. DSP is located at 260 César Chávez Student Center. Students may call 642-0518 (voice), 642-6376 (TTY), or e-mail dsp@berkeley.edu.
- *Tang Center: Counseling and Psychological Services* <https://uhs.berkeley.edu/counseling> CPS offers short term counseling for academic, career and personal issues. There is no charge to get started, and all registered students can access services regardless of their insurance plan. There is no charge to get started, and all registered students can access services regardless of their insurance plan.
- *Path to Care* <http://sa.berkeley.edu/dean/confidential-care-advocate> The PATH to Care Center provides affirming, empowering, and confidential support for survivors and those who have experienced gendered violence, including: sexual harassment, dating and intimate partner violence, sexual assault, stalking, and sexual exploitation. Confidential advocates bring a non-judgmental, caring approach to exploring all options, rights, and resources.
- *Student Wellness Resources* <https://wellness.asuc.org/> A partial directory outlining campus services that may prove useful throughout a student's time, ranging from direct academic assistance to student health and wellness resources.
- *The Basic Needs Center* <https://basicneeds.berkeley.edu/> provides support with all the essential resources (food, housing, etc.) needed to not only survive, but thrive here at UC Berkeley.
- *Suggestions or comments about your courses, the department or your instructors can also be submitted anonymously via the Questions and Comments section of the physics departments' DE&I website.* <https://physics.berkeley.edu/about-us/equity-inclusion/faq-on-sexual-harassment/submit-a-question>

Statement of Commitment to Equity and Inclusion

- *All individuals in the Department of Physics have the right to work and learn together in an environment free of harassment, exploitation, or intimidation. We seek to establish a classroom culture that nurtures the physics identity and remove barriers to entry in order to strengthen pathways into the field. Setting students on a path to envision themselves with a degree in physics and related STEM fields in greater numbers ensures more diverse graduating classes, more diverse graduate programs, and in turn has the potential to inspire a new generation of physicists. We strive to ensure these ideals are the core of our culture.*
- *Exams and assignments in this course are a diagnostic of your current skill levels, which can be improved with practice, and are not a measure of permanent ability. As a participant in this class, you can be proactive about making other students feel included and respected. We encourage you to approach your instructor or Student Services if:*
 - *Your official records do not reflect your correct name and/or set of pronouns that you would like us to use.*
 - *Your performance in the class is impacted by your experiences outside the class (e.g., family matters, current events); we would like to help you find resources to cope. See the Links to University Services below).*
 - *Something was said in class (by anyone) that made you feel uncomfortable.*

Academic Dishonesty

I strongly encourage you to work with your fellow students when appropriate, for example during DIS/LAB sections and when you do your HW. However, exams should reflect your own work and any form of cheating will be treated very severely, most likely by your failing the entire course and by referral to Student Judicial Affairs: <http://students.berkeley.edu/uga/conduct.asp>.

Land Acknowledgement

Native American Student Development recognizes that UC Berkeley sits on the territory of xučyun (Huichin), the ancestral and unceded land of the Chochenyo speaking Ohlone people, the successors of the sovereign Verona Band of Alameda County. This land was and continues to be of great importance to the Muwekma Ohlone Tribe and other familial descendants of the Verona Band.

We recognize that every member of the Berkeley community has, and continues to benefit from, the use and occupation of this land, since the institution's founding in 1868. Consistent with our values of community, inclusion and diversity, we have a responsibility to acknowledge and make visible the university's relationship to Native peoples. As members of the Berkeley community, it is vitally important that we not only recognize the history of the land on which we stand, but also, we recognize that the Muwekma Ohlone people are alive and flourishing members of the Berkeley and broader Bay Area communities today.

This acknowledgement was co-created with the Muwekma Ohlone Tribe and Native American Student Development and is a living document.

Visit UC Berkeley's website for the Centers for Educational Justice & Community Engagement at <https://cejce.berkeley.edu/ohloneland> for more information.

Non-Discrimination Statement

In accordance with applicable Federal and State law and University policy, the University of California, Berkeley, does not discriminate on the basis of race, color, national origin, religion, sex, gender identity, pregnancy, physical or mental disability, medical condition (cancer related or genetic characteristics), ancestry, marital status, age, sexual orientation, citizenship, or service in the uniformed services. The University of California, Berkeley also prohibits sexual harassment. This nondiscrimination policy covers the following individuals: students, employees, applicants for admission and employment, access, and treatment in University programs and activities.

The federal and state laws and regulations prohibiting discrimination and harassment include the Americans with Disabilities Act (ADA), Section 504 of the Rehabilitation Act of 1973, Title IX of the Education Amendments of 1972, Title VII of the Civil Rights Act of 1964 as Amended by the Equal Employment Opportunity Act of 1972, and the California State.

<u>Week</u>	<u>Lectures</u>	<u>Topics</u>	<u>Reading</u>	<u>Labs</u>
1	Jan. 18, 20	Thermal expansion, ideal gas law, kinetic theory	17.4, 17.7-9,18.1-2	<i>No Lab</i>
2	Jan. 25, 27	Phase changes, heat, internal energy, specific heat, calorimetry, latent heat, work, first law, equipartition	18.3-4(evaporation only), 19.1-9	<i>No Lab</i>
3	Feb. 1, 3	Heat conduction, Heat Engines, Entropy, Second law	19.10(conduction only), 20.1-3, 20.5-6	<i>No Lab</i>
4	Feb. 8, 10	Electric charge, Force, Field	21.1-10	Heat engine
5	Feb. 15, 17	Electric dipole, Flux, Gauss's law	21.11, 22.1-2	<i>No Lab</i>
6 ^I	Feb. 22, 24	Applications of Gauss's law	22.3	<i>Midterm 1</i>
7	Mar. 1, 3	Electric Potential	23.2-8	<i>No Lab</i>
8	Mar. 8, 10	Capacitors	24.1-6	Equipot. lines & E. field
9	Mar. 15, 17	Current, Resistors, DC circuits	25.1-5, 25.8, 26.1-5	<i>No Lab</i>
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10 ^{II}	Mar. 29, 31	Magnetic force, Magnetic dipole, Hall effect	27.1-8	<i>Midterm 2</i>
11	Apr. 5, 7	Ampère's law and applications	28.1-5	DC circuits
12	Apr. 12, 14	Biot-Savart law and applications	28.6-7	<i>No Lab</i>
13	Apr. 19, 21	Electromagnetic induction	29.1-4	e/M
14	Apr. 26, 28	Inductance, LR and LC circuits	30.1-5, 25.7, 29.6	O-scope & time dep.
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^IMidterm I: Thursday, Feb.24, 7-9pm, Wheeler 150

^{II}Midterm II: Tuesday, Mar.29, 7-9pm, Wheeler 150

Final Exam: Monday, May 9, 11:30am-2:30pm, TBD