

Physics for Modern Citizens

Spring 2022

We are citizens of the modern world, surrounded by advanced technologies, many of which came from Physics - the scientific discipline that aims to understand natural phenomena such as energy, motion, and matter. To understand the world and our place in it, to make informed decisions in our daily life, to demand changes and find solutions to the most pressing problems of our day, we as the modern citizens need to have a basic understanding of physics and the many roles it plays in our life. And that is what this course is about.

Prof. Na Ji

Lecture

Office Hour

jina@berkeley.edu

TuTh 11 am – 12:30 pm

Tu 2 - 3 pm

GSI: TBA

Course Website: <http://bcourses.berkeley.edu>. ([Links to an external site.](#)) The website contains course information, important notices, homework assignments, and quizzes.

Prerequisites: No prior physics is required. In fact, even if you had no physics in high school, you will not be at a disadvantage. Moreover, even if you are a physics major, you will find that most of the material is new. Physics majors spend so much time learning the math and to abstract calculations that they often do not get to the important results. The course does use some math, at the level that every college graduate should be comfortable with. You should be able to use scientific notation for very large or very small numbers, as well as calculator notation (i.e., 1 million = $10^6 = 1E6$, 1 millionth = $10^{-6} = 1E-6$). In addition, you should be able to find square roots.

Lecture Schedule: I will try my best to stick to the lecture schedule below. I will regularly update the schedule and clearly communicate what topics will and won't be covered.

Date	Day	Reading	Details
Jan 18	Tu	Ch 1	Intro, Energy
Jan 20	Th	Ch 1	Energy, Power
Jan 25	Tu	Ch 2	Atoms and Heat
Jan 27	Th	Ch 2	Atoms and Heat
Feb 1	Tu	Ch 3	Gravity, Force, and Space

Feb 3	Th	Ch 3	Gravity, Force, and Space
Feb 8	Tu	Ch 4	Nuclei and Radioactivity
Feb 10	Th	Ch 4, Ch 5	Nuclei and Radioactivity; Chain reactions, nuclear reactors, and atomic bombs
Feb 15	Tu	Ch 5	Chain reactions, nuclear reactors, and atomic bombs
Feb 17	Th	Ch 10	Climate change
Feb 22	Tu		No lecture
Feb 24	Th		Midterm 1
Mar 1	Tu	Ch 6	Electricity and magnetism
Mar 3	Th	Ch 6	Electricity and magnetism
Mar 8	Tu	Ch 7	Waves
Mar 10	Th	Ch 7	Waves
Mar 15	Tu	Ch 8	Light
Mar 17	Th	Ch 8	Light
Mar 29	Tu	Ch 9	Invisible Light

March 31	Th	Ch 9	Invisible Light
Apr 5	Tu		No Lecture
Apr 7	Th		Midterm 2
Apr 12	Tu	Ch 11	Quantum Physics
Apr 14	Th	Ch 11	Quantum Physics
Apr 19	Tu	Ch 12	Relativity
Apr 21	Th	Ch 13	The Universe
Apr 26	Tu	Ch 13	The Universe
Apr 28	Th		Final review
May 12	Th		Final exam at 8 – 11 am

Attendance: Required for the Discussion sections, and highly recommended for the Lecture. Attendance at each lecture will earn you a bonus 0.25% of the grade, and will be determined by the quizzes in Lecture. You can miss three Discussion sections, but more absence needs to be excused by emailing your GSI. More than three unexcused absence will drop your grade by a point, i.e. your A becomes a B, your B+ becomes a C+, etc.

To be excused, you must send an email to your GSI with your reason for missing prior to missing the class. Please format the subject line of the email with: “[Physics C10]: Last name, First name, day of month to be excused, month” (e.g., [Physics C10]: Smith, Sally 14 February). The text of your email should be your reason for missing class. It could be due to illness, attending a sporting event, a need to pick up a friend at the airport, etc. Don't be creative; be honest. If there was some reason that you could not send the email prior to the class, then send it afterwards to your GSI with an explanation for the lateness.

Required Material: Our textbook is R.A. Muller, “Physics and Technology for Future Presidents”, Princeton University Press (2010). I will provide a list of supplementary readings as well.

Required Reading: You are expected to read each chapter of the book prior to the lecture according to the lecture schedule. Your understanding of the material will be tested in weekly quizzes (due every Tuesday at 9:00 am).

Weekly Homework: Unless otherwise noted (e.g. during midterm weeks), homework will be assigned and due weekly on Tuesdays. Each assignment will consist of two parts: a 10-problem (occasionally 20-problem) multiple-choice quiz (posted under “Quizzes” on bCourses) and an essay, **both due each Tuesday before 9:00 am.**

Essays: Write an essay on the weekly assigned reading (e.g., a technology news article) which is related to physics or technology. The reason for an assigned topic is to make the homework more relevant to the content of the lecture, and to give everyone the background for an informed discussion at the discussion section. Essays should be 500 – 750 words long and submitted to bCourses. This is a college class, and college-level writing is expected. Essays will be graded on 0-5 scale, with 2 points based on the quality of writing (structure and grammar) and 3 based on content. **You must include one outside source and cite all sources in the writing as appropriate.**

Late homework submissions (essays or quizzes) will generally not be accepted, unless there is an extraordinary excuse. However, I will drop your lowest homework score at the end of the semester.

Discussion Section: We will cover materials taught in lectures of the previous week. You may work in groups on materials that will help improve your conceptual understanding of the course material, see how the material relates to everyday life, and build physical intuition for each topic. The goal is for you to learn physics concepts, and discussing them with your peers is often the best way to learn. Weekly essays will help set the stage for the Discussion section topics.

Exams: Exam dates and times are included in lecture schedule. There will be two in-class midterm examinations and a final exam, using bCourses. **No makeup exams.** I will not give makeup exams or change the dates. I will let team members who are on travel take the exam proctored by their coach, and I will excuse students who have serious conflicts (e.g., death in the family, wedding of a sibling, serious illness with a doctor’s excuse). It is your responsibility to check for conflicts with these exams and notify me well in advance if you are planning to be absent. The format of the exams will be multiple-choice questions plus short essay questions.

Grading: Grades will be determined from all the elements of the course as follows:

- Homework quizzes: 10%
- Homework essays: 10%
- Midterm 1: 20%
- Midterm 2: 20%
- Final exam: 40%
- Bonuses: 0.25% will be given for each lecture attended in person.

A grade of "Incomplete" will only be given under dire circumstances beyond a student’s control, and only when work already completed is of at least C quality. This course will be graded on a curve based on University guidelines.

If you are in trouble (behind in homework, doing worse in the course than you would like, etc.) for whatever reason, please let us know. We'll try to help! 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.

Communication: Use bCourses website for general discussion with your peers and me. To communicate with your instructor or GSI for personal questions, please email directly. Please put [Physics C10] in the subject of your email.

Honor Code: <https://teaching.berkeley.edu/berkeley-honor-code>[Links to an external site.](#)

The UC Berkeley honor code reads "As a member of the UC Berkeley community, I act with honesty, integrity, and respect for others." The instructor, course staff, and students will be expected to uphold this honor code in all respects of the course.

As in every class at Cal, you are expected to abide by the [Berkeley Honor code](#)[Links to an external site.](#) You are allowed (and encouraged) to discuss homework and workshop assignments with your peers or instructors, but you are personally responsible for each assignment. Plagiarism (e.g. copying from external sources verbatim without proper acknowledgement) is considered cheating and will not be tolerated. Any student caught cheating will receive academic sanctions in the course and will be referred to the Center for Student Conduct.

Student Code of Conduct: <http://sa.berkeley.edu/code-of-conduct>[Links to an external site.](#)

The instructor and students are expected to behave with the utmost of integrity, responsibility, and civility towards all members of the classroom as well as staff. Additionally, all members of the community are expected to comply with all laws, University policies, and campus regulations, conducting themselves in ways that support a thriving learning environment. For more information, see the linked document. Violation of the code of conduct can result in disciplinary steps as outlined in the code.

Use of Course Materials: The materials provided by the instructor in this course including, but not limited to, lecture notes, homework assignments, solution sets, exams, exam solutions, and study materials (collectively "course materials") are for the use of the students current enrolled in the course only. Distribution or public display of the course materials by students for non-enrolled students is not permitted, and may constitute academic misconduct under Sections 102.01, 102.05, and 102.23 of the student code of conduct. The course materials are also subject to copyright protection, with copyright held by the instructor. As such, the course materials may not be duplicated, distributed, publicly displayed, or modified in a manner contrary to law.

Mental Health and Other Resources: The pandemic have introduced a lot more stress and challenges into the student experience. Please take care of yourself and prioritize your physical and mental health. The following links may be of use if you or a friend are in trouble:

CAPS (Counseling and Psychological Services) Website: <https://uhs.berkeley.edu/caps>[Links to an external site.](#)

CAPS COVID-19 Website: <https://uhs.berkeley.edu/coronavirus/student-mental-health>[Links to an external site.](#)

Helping a Distressed Friend: https://uhs.berkeley.edu/sites/default/files/distressed_friend.pdf[Links to an external site.](#)

Student Advocates Office: <https://advocate.berkeley.edu/>[Links to an external site.](#)

Division of Student Affairs COVID-19 Toolkit: <https://sa.berkeley.edu/covid19>Links to an external site.
Student Technology Equity Program: <https://technology.berkeley.edu/STEPL>Links to an external site.

UC Berkeley Basic Needs Guide to COVID-19: https://docs.google.com/document/d/1WwPF-Q3Z8EXBfM-Wf_WwBzdTU39hfz85JL2F8Z5IfDE/edit?usp=sharing