



USC University of Southern California

PHYS 100Lxg: The Physical World Fall 2023

Units: 4

Lectures: MWF 11:00-11:50 AM

Location: [SLH 100](#)

Instructor: Aaron Wirthwein

Office: [SHS 369](#)

Office Hours: TBA

Contact Info: wirthwei@usc.edu

Course Description

This course is an introductory level physics course designed for students who have not had previous exposure to physics or who have limited experience with the subject. The course covers a broad range of topics in classical mechanics, electromagnetism, thermodynamics, and modern physics. In this course, you will learn the fundamental principles of physics, including how objects move and interact with one another. You will also learn about waves and oscillations, electricity and magnetism, and the properties of light. Additionally, you will study the laws of thermodynamics, which describe the behavior of energy in physical systems. The course is designed to be accessible to students from all backgrounds and does not require any prior knowledge of mathematics beyond basic algebra. However, mathematical concepts are introduced gradually as they become necessary for understanding the physical principles being discussed. The course will be delivered through a combination of lectures, laboratory experiments, and problem-solving exercises. Laboratory experiments are an integral part of the course and are designed to provide hands-on experience with the concepts being discussed in class. By the end of this course, you will have developed a strong understanding of the fundamental principles of physics and will be able to apply these principles to solve problems in a variety of contexts. You will also have developed critical thinking and problem-solving skills that can be applied to other areas of study and in everyday life.

Learning Objectives

This course aims to provide students with a strong foundation in the fundamental principles of physics and the skills necessary to apply these principles to solve problems and make informed decisions in their academic and professional pursuits. Specific course objectives are as follows:

1. Develop an understanding of the fundamental principles of physics, including concepts related to motion, force, energy, and momentum.
2. Apply mathematical tools to solve problems related to the physical principles being studied, including algebraic manipulation and graphical analysis.
3. Develop critical thinking and problem-solving skills that can be applied to physics and other areas of study.
4. Develop effective laboratory skills and an ability to design and conduct experiments to test hypotheses.
5. Work collaboratively and communicate scientific ideas both verbally and in writing.
6. Appreciate the role of physics in modern society and its contribution to technology and innovation.

Communication

Announcements, illustrative material, grades, etc. will be posted on Blackboard.

Technological Proficiency and Hardware/Software Required

Students are expected to be proficient in using Blackboard. Students will require a hand calculator (e.g., on smartphone or personal computer) to do some of the laboratory and examination exercises.

USC technology rental program

If you need resources to successfully participate in your classes, such as a laptop or internet hotspot, you may be eligible for the university's equipment rental program. To apply, please [submit an application](#).

USC Technology Support Links

[Zoom information for students](#)

[Blackboard help for students](#)

[Software available to USC Campus](#)

Textbook

Good news: your textbook for this class is available for free online! If you prefer, you can also get a print version at a very low cost. Your book is available in web view and PDF for free. You can use whichever formats you want. Web view is recommended. If you buy on Amazon, make sure you use the link on your book page on openstax.org so you get the official OpenStax print version. Suggested reading from the textbook will be posted before class on Blackboard.

College Physics from OpenStax, Print ISBN 1938168003, Digital ISBN 1947172018,
www.openstax.org/details/college-physics

Laboratory assignments

Physics is first and foremost an experimental science, and the laboratory is an essential part of our course. You must register for a Physics 100Lxg laboratory section. Labs will be held in SGM 314 and will meet once every two weeks. Be sure to attend the first lab meeting so that your spot is not given away. For all issues regarding the laboratory component of this course, you should contact (1) your TA and (2) the laboratory director, Joseph Vandiver (vandiver@usc.edu, SGM 309). Additional information on lab policies and procedures is provided in the Laboratory Manual and during your first lab meeting.

Homework assignments:

There will be weekly homework assignments. The assignments will be composed of both conceptual and quantitative assessments. All assignments are due on Monday nights at 11:59 PM. All assignments will be posted on Blackboard, and all completed assignments will be submitted via Blackboard. In computing your course grade, I will drop the lowest score for one assignment. If you fail to submit a particular homework, it will be counted as a zero. Late homework will not be accepted. You are encouraged to work together on the homework assignments. In fact, the best way to make sure you understand how to answer a question is to see if you can explain it to someone else. However, the final submission must be your own.

Examinations

The three examinations will evaluate student comprehension of the lecture and textbook material:

- Midterm Exam 1 will be given during class on Monday, September 18th.
- Midterm Exam 2 will be given during class on Monday, October 23rd.
- Final Exam will be 11 AM to 1 PM on Wednesday, December 6th.

If you want to do well on the exams, I encourage you to attend class, take notes, read the assigned materials, and review the lectures.

If you have to miss an examination because of illness or an academic conflict, you must inform the instructor by email in advance, and provide documentation. Make-ups of examinations will, in general, NOT be permitted except for extraordinary circumstances (e.g., documentable conflicts with other USC-related commitments). In the case of a missed midterm, where a reasonable excuse exists, the midterm may be waived with a score assigned that reflects the average of your work done on the other two exams.

Maximum Scoring for Each Grade Element

Student grades are based on the cumulative score of 100 grade points summed over six graded elements: in-class exercises, laboratory work, homework assignments, two mid-term exams, and a final exam. The maximum number of points that can be earned for each element is given in the following table:

Graded Element	% of Grade
In-Class Exercises	10
Laboratory Assignments	20
Homework Assignments	20
Midterm Exam 1	15
Midterm Exam 2	15
Final Exam	20
Total	100

Students must pass each component of the course separately to receive a passing grade in the class.

Grading Scale

Each student will receive a final grade based on their cumulative score.

A	95-100
A-	90-94
B+	87-89
B	83-86
B-	80-82
C+	77-79
C	73-76
C-	70-72
D+	67-69
D	63-66
D-	60-62
F	59 and below

Disability Services

Students requesting academic accommodations based on a disability are required to register with Disability Services and Programs (DSP) each semester. A letter of verification for approved accommodations can be obtained from DSP when adequate documentation is filed; please be sure the letter is delivered to the instructor as early in the semester as possible. DSP is open Monday-Friday, 8:30-5:00. The office is in Student Union 301 and the phone number is (213) 740-0776.

Statement on Academic Conduct and Support Systems

Academic Conduct:

Plagiarism – presenting someone else’s ideas as your own, either verbatim or recast in your own words – is a serious academic offense with serious consequences. Please familiarize yourself with the discussion of plagiarism in SCampus in Part B, Section 11, “Behavior Violating University Standards” policy.usc.edu/scampus-part-b. Other forms of academic dishonesty are equally unacceptable. See additional information in SCampus and university policies on scientific misconduct, policy.usc.edu/scientific-misconduct.

Support Systems:

Counseling and Mental Health - (213) 740-9355 – 24/7 on call

studenthealth.usc.edu/counseling

Free and confidential mental health treatment for students, including short-term psychotherapy, group counseling, stress fitness workshops, and crisis intervention.

National Suicide Prevention Lifeline - 1 (800) 273-8255 – 24/7 on call

suicidepreventionlifeline.org

Free and confidential emotional support to people in suicidal crisis or emotional distress 24 hours a day, 7 days a week.

Relationship and Sexual Violence Prevention Services (RSVP) - (213) 740-9355(WELL), press “0” after hours – 24/7 on call

studenthealth.usc.edu/sexual-assault

Free and confidential therapy services, workshops, and training for situations related to gender-based harm.

Office of Equity and Diversity (OED) - (213) 740-5086 / Title IX – (213) 821-8298

equity.usc.edu, titleix.usc.edu

Information about how to get help or help someone affected by harassment or discrimination, rights of protected classes, reporting options, and additional resources for students, faculty, staff, visitors, and applicants.

Reporting Incidents of Bias or Harassment - (213) 740-5086 or (213) 821-8298

usc-advocate.symplicity.com/care_report

Avenue to report incidents of bias, hate crimes, and microaggressions to the Office of Equity and Diversity |Title IX for appropriate investigation, supportive measures, and response.

The Office of Disability Services and Programs - (213) 740-0776

dsp.usc.edu

Support and accommodations for students with disabilities. Services include assistance in providing readers/notetakers/interpreters, special accommodations for test taking needs, assistance with architectural barriers, assistive technology, and support for individual needs.

USC Campus Support and Intervention - (213) 821-4710

campussupport.usc.edu

Assists students and families in resolving complex personal, financial, and academic issues adversely affecting their success as a student.

Diversity at USC - (213) 740-2101

diversity.usc.edu

Information on events, programs and training, the Provost's Diversity and Inclusion Council, Diversity Liaisons for each academic school, chronology, participation, and various resources for students.

USC Emergency - UPC: (213) 740-4321, HSC: (323) 442-1000 – 24/7 on call

dps.usc.edu, emergency.usc.edu

Emergency assistance and avenue to report a crime. Latest updates regarding safety, including ways in which instruction will be continued if an officially declared emergency makes travel to campus infeasible.

USC Department of Public Safety - UPC: (213) 740-6000, HSC: (323) 442-120 – 24/7 on call

dps.usc.edu

Non-emergency assistance or information.

Course Schedule

	Lecture & Discussion Topics	Readings	Laboratory
Week 1	Physical Quantities & Measurements	Ch. 1	Basic Physics
Week 2	Basic Kinematics	Ch. 2	
Week 3	Newton's Laws of Motion	Ch. 4	Video Analysis of Motion
Week 4	Uniform Circular Motion & Gravitation	Ch. 6	
Week 5	Energy & Momentum Midterm Exam 1	Ch. 7 & 8	Conservation Laws
Week 6	Waves & Vibrations	Ch. 16	
Week 7	Temperature and Kinetic Theory	Ch. 13	Waves & Sound
Week 8	Heat and Heat Transfer	Ch. 14	
Week 9	Thermodynamics and Heat Engines	Ch. 15	
Week 10	Static Electricity Midterm Exam 2	Ch. 18-19	Thermal Energy
Week 11	Circuits and Ohm's Law	Ch. 20-21	
Week 12	Electromagnetism	Ch. 22-24	Light & Color
Week 13	Einstein's Theory of Relativity	Ch. 28	
Week 14	Atomic Structure and Quantum Theory	Ch. 29-30	
Week 15	Nuclear Fission and Fusion	Ch. 31	
FINAL			