

# Physics 135aL: Physics for the Life Sciences

## Section 50340 – Spring 2024

Lecture: SLH 100, Mon/Wed 8:30 – 9:50 AM

**\*\*\*See me ASAP if you were not present on the first day of class or enrolled late for the course\*\*\***

### Instructor: Aaron Wirthwein

Office: SHS 370 (my office), SHS 363 (conference room where office hours will take place)

Office Hours: Mon/Wed, 10 – 11 AM; Tues/Thu, 4 – 5 PM

Contact Info: [wirthwei@usc.edu](mailto:wirthwei@usc.edu). Please include “Phys 135a” in the subject line.

### Course Description

Welcome to Physics 135aL! This is the first semester in the physics sequence for students majoring in the life sciences or preparing to enter a health-related profession. Physics 135aL will cover the most basic concepts of classical mechanics, sounds, fluids, and thermodynamics. These physical theories explain a wide variety of phenomena directly accessible to our senses and have revolutionized technology and our understanding of nature. No prior knowledge of physics is required.

### 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.
2. Develop critical thinking and problem-solving skills that can be applied to physics and other areas.
3. Apply mathematical tools to solve problems including algebraic manipulation and graphical analysis.
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.

**Recommended Preparation:** Mathematics is the language of physics. However, only minimal knowledge will be assumed for this course. The prerequisite for this course is a working knowledge of **elementary algebra and trigonometry**. I highly recommend reviewing the notes on algebra and trigonometry provided by Paul Dawkins of Lamar University at the following address: <https://tutorial.math.lamar.edu/>

### Registration:

Your registration for this course consists of three separate parts: a lecture, a quiz, and a laboratory. The quiz section is shared by both lecture sections so that a common time for all sections can be set aside for the midterms. **Quiz sections will only be used for the two midterms** in this course (see course schedule).

Students who are repeating 135aL must obtain written permission from the Undergraduate Physics Office (ACB 439, [physics@domsife.usc.edu](mailto:physics@domsife.usc.edu)) in order to be excused from repeating the laboratory.

### Required Materials

1. Course Textbook: D.C. Giancoli, *Physics: Principles and Applications*, 7 ed, Prentice Hall
2. The laboratory manual will be provided on the lab’s Blackboard site. You will need to read the manual in advance of your lab meetings. Questions concerning the laboratory should be referred to the Lab Director, Dr. Gökhan Esirgen (KAP B19; [esirgen@usc.edu](mailto:esirgen@usc.edu)).

### Course Websites

- **Blackboard** to distribute course materials and submit homework assignments.
- **Gradescope** will be used to submit exams and in-class group activities.
- **Piazza** will be used as a learning management system which allows students to ask questions in a forum-type format.

All links will be provided on Blackboard.

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Last updated: January 7, 2024

## Grading Breakdown

Your final course grade will depend on five major components:

Assessment Tool	% of Grade
Homework and Group Activities (in-class)	10%
Midterm 1	20%
Midterm 2	20%
Final Exam	30%
Laboratory	20%
<b>TOTAL</b>	<b>100%</b>

## Grading Scale

Use the following scale as a rough guide for determining your final course grade.

A	93-100
A-	90-92
B+	85-89
B	80-84
B-	75-79
C+	70-74
C	65-69
C-	60-64
D+	55-59
D	50-54
F	49 and below

## Minimum Requirements for Passing

To receive a passing grade (D or above) you must pass **both** the lecture and lab components. To pass this course, you must meet the following minimum requirements:

- Complete 100% of the labs and earn a score of 70% or higher in the laboratory grade.
- Submit 75% of all homework assignments. **Even incomplete assignments will count as submitted.**
- Complete 70% of the in-class group activities. Failure to complete 70% or more will result in a 0 for the homework score.
- You must pass the comprehensive final exam to pass the course.

## Homework Assignments

Homework will be assigned every week. We expect that it will take you, in total, approximately 4-6 hours to complete each of these homework assignments. The homework will be generally more difficult than the problems you will face on the exams.

Homework will be due before 11:59 PM on Fridays. Solutions to the homework assignments will be posted on Blackboard immediately after the deadline. As such, **late work will not be accepted.**

It is very important that your solutions are written legibly and with enough details so that anybody can understand them. Be sure to show intermediate steps and **use words, not just equations**, to explain the solution. **A solution consisting of a string of equations with no comments, a figure if required, or some minimal explanation will be considered unsatisfactory and graded accordingly.**

## Examinations

There will be three examinations that evaluate your comprehension of the lecture material:

- Midterm Exam 1 will be Tuesday February 13<sup>th</sup> from 5:00 – 6:10 PM.
- Midterm Exam 2 will be Tuesday March 26<sup>th</sup> from 5:00 – 6:10 PM.
- Final Exam will be Thursday May 2<sup>nd</sup> from 11:00 AM to 12:30 PM.

You will be given an equations sheet for the exams, but you are responsible for understanding the meaning of the various terms and the circumstances under which each relationship applies.

Students with special examination requirements as documented by the Office of Student Accessibility Services must present their documentation to the instructor no later than seven days before the exam, or as soon as the accommodation is granted.

Please email your LOA to the instructor at [wirthwei@usc.edu](mailto:wirthwei@usc.edu) with the subject line “Phys 135a OSAS LOA.”

## Lectures

The purpose of the lecture is to introduce and carefully examine the core concepts of physics. I will do my best to split our time evenly between derivations, examples, group activities, and lecture demonstrations. While we will spend time discussing examples, your homework will generally be more difficult than the examples we cover in class.

**Come to class prepared and ask questions.** I find that students are more likely to ask questions during the lecture period if they have spent time trying to understand the material on their own. Read the relevant section in the textbook and make a list of questions before coming to class. **If you are confused, you are not alone!** Your questions help me get a sense of what topics need more attention for the class as a whole.

## Attendance and Participation

Participation in classroom exercises is an important element of the education this class offers. These exercises include group activities and conceptual questions and will be used to determine your “in-class activity” score. **You cannot receive credit for this in-class work if you are not present, no exceptions.** While I do not grade you on attendance, it is the precondition for receiving credit for the work that we will do in class. As stated above, you must complete at least 70% of in-class activities to receive a homework grade in the course.

## Supplemental Instruction

Supplemental Instruction (SI, <http://www.usc.edu/si>) is an academic program organized by the Dornsife College of Letters, Arts, and Sciences, designed to improve student performance in this course and in several other traditionally difficult courses. It is free and does not require academic credit. Each week there will be several sessions led by the SI leader Anshuman Patnaik who will be working together with the instructors and attending the same lectures as you do. For further information, see the SI web site, or contact its director, Toni Richardson ([tonirich@usc.edu](mailto:tonirich@usc.edu)).

## TA Office Hours

All physics TA’s have office hours in ACB 431 for the assistance of students in 100-level physics courses. The TA office hours will be arranged during the first week of class and posted on the door of ACB 431 (as well as on Blackboard).

## Faculty Liaison

All courses in the Department of Physics & Astronomy have an assigned Faculty Liaison to serve students as a confidential, neutral, informal, and independent resource when they wish to discuss issues concerning their course without directly confronting their instructor. The Faculty Liaison for this course is Prof. Jack Feinberg ([feinberg@usc.edu](mailto:feinberg@usc.edu), 213-740-1134, SSC 327).

## Important Dates

January 8 <sup>th</sup>	Spring semester classes begin
January 15 <sup>th</sup>	Martin Luther King Day
January 26 <sup>th</sup>	Last day to drop without mark of “W,” and last day to change enrollment option.
February 13 <sup>th</sup>	Midterm 1
February 19 <sup>th</sup>	President’s Day
March 26 <sup>th</sup>	Midterm 2
April 5 <sup>th</sup>	Last day to drop with mark of “W”
April 26 <sup>th</sup>	Spring semester classes end
May 2 <sup>nd</sup>	Final Exam

**PLEASE DO NOT SCHEDULE FLIGHTS HOME BEFORE THE FINAL EXAM!**

## Course Schedule

#	Week of	Chapter and Subject
Week 1	8-Jan	Chapter 1: Introduction, Measurements, Estimating
Week 2	15-Jan	Chapter 2: Kinematics in 1D
Week 3	22-Jan	Chapter 3: Kinematics in 2D; Vectors
Week 4	29-Jan	Chapter 4: Newton's Laws of Motion
Week 5	5-Feb	Chapter 5: Circular Motion; Gravitation
Week 6	12-Feb	Chapter 6: Work and Energy
Week 7	19-Feb	Chapter 7: Linear Momentum
Week 8	26-Feb	Chapter 8: Rotational Motion
Week 9	4-Mar	Chapter 10: Fluids
Week 10	11-Mar	<b>Spring Break</b>
Week 11	18-Mar	Chapter 11: Oscillations and Waves
Week 12	25-Mar	Chapter 12: Sound
Week 13	1-Apr	Chapter 13: Temperature
Week 14	8-Apr	Chapter 14: Heat
Week 15	15-Apr	Chapter 15: Laws of Thermodynamics

### 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 exercises. You may use any calculator on the exams, but smartphones or other smart devices will not be allowed.

### 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](#)

### Statement on Academic Conduct and Support Systems

For information about academic integrity see [the student handbook](#) or the [Office of Academic Integrity's website](#), and university policies on [Research and Scholarship Misconduct](#).

### Students and Disability Accommodations:

USC welcomes students with disabilities into all of the University's educational programs. [The Office of Student Accessibility Services](#) (OSAS) is responsible for the determination of appropriate accommodations for students who encounter disability-related

barriers. Once a student has completed the OSAS process (registration, initial appointment, and submitted documentation) and accommodations are determined to be reasonable and appropriate, a Letter of Accommodation (LOA) will be available to generate for each course. The LOA must be given to each course instructor by the student and followed up with a discussion. This should be done as early in the semester as possible as accommodations are not retroactive. More information can be found at [osas.usc.edu](https://osas.usc.edu). You may contact OSAS at (213) 740-0776 or via email at [osasfrontdesk@usc.edu](mailto:osasfrontdesk@usc.edu).

**Please email your LOA to the instructor at [wirthwei@usc.edu](mailto:wirthwei@usc.edu) with the subject line “Phys 135a OSAS LOA.”**

### **Support Systems:**

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

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

[988 Suicide and Crisis Lifeline](#) - 988 for both calls and text messages – 24/7 on call

The 988 Suicide and Crisis Lifeline (formerly known as the National Suicide Prevention Lifeline) provides free and confidential emotional support to people in suicidal crisis or emotional distress 24 hours a day, 7 days a week, across the United States.

[Relationship and Sexual Violence Prevention Services \(RSVP\)](#) - (213) 740-9355(WELL) – 24/7 on call

Free and confidential therapy services, workshops, and training for situations related to gender- and power-based harm (including sexual assault, intimate partner violence, and stalking).

[Office for Equity, Equal Opportunity, and Title IX \(EEO-TIX\)](#) - (213) 740-5086

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

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

[The Office of Student Accessibility Services \(OSAS\)](#) - (213) 740-0776

OSAS ensures equal access for students with disabilities through providing academic accommodations and auxiliary aids in accordance with federal laws and university policy.

[USC Campus Support and Intervention](#) - (213) 740-0411

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

[Diversity, Equity and Inclusion](#) - (213) 740-2101

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

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) 442-1200 – 24/7 on call

Non-emergency assistance or information.

[Office of the Ombuds](#) - (213) 821-9556 (UPC) / (323-442-0382 (HSC)

A safe and confidential place to share your USC-related issues with a University Ombuds who will work with you to explore options or paths to manage your concern.

[Occupational Therapy Faculty Practice](#) - (323) 442-2850 or [otfp@med.usc.edu](mailto:otfp@med.usc.edu)

Confidential Lifestyle Redesign services for USC students to support health promoting habits and routines that enhance quality of life and academic performance.