

PHYSICS 135BL: PHYSICS FOR THE LIFE SCIENCES

FALL 2024

Instructor Information

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SHS 369
Office Hours: Friday 2:30-4:00 pm

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Office Hours: Wednesday 2:00-3:00 pm

Course Information

Lecture 50362 (Martini section):	MWF	12:00 – 12:50am	SLH 102
Lecture 50360 (Boedicker section):	TTh	11:00 – 12:20pm	SLH 102
Quiz:	T	5:00 – 6:20pm	TBA

Welcome to Physics 135BL! This is the second course in the two-semester Physics series intended to meet the needs of students majoring in the Natural Sciences other than Physics, Chemistry, or Engineering and who are preparing to enter one of the health-oriented professions.

The subject matter of this course includes electricity and magnetism, optics, relativity, and nuclear physics. The goal of the course is to teach you how to approach and solve physical problems and how to develop an intuition for the important physical properties which affect a given situation.

1. COURSE MATERIALS

1.1 Required textbook for the lecture

D. C. Giancoli, *Physics: Principles with Applications*, 7th edition, Pearson, 2013.

1.2 Required for the laboratory

See Laboratory Brightspace page. Questions concerning the laboratory should be referred to the Instructional Laboratory Manager, Dr. Gökhan Esirgen (KAP B19; Email: esirgen@usc.edu).

2. IMPORTANT GUIDELINES

2.1 Mathematics prerequisites

Mathematics is the language of physics. However, only minimal mathematical knowledge will be assumed for this course. The prerequisite for this course is a working knowledge of elementary algebra

and trigonometry. Use of trigonometry will be restricted to simple situations (*i.e.*, almost entirely right triangles). Giancoli's textbook has a brief review in Appendix A.

2.2 Registration and administration

Your registration for this course consists of three separate parts: the lectures, a “quiz section,” and the laboratory. You must register for each of them. The only exception is if you have previously completed the laboratory and have received permission to carry its grade into the current semester, then you would register only for the lecture and the “quiz section.” The “quiz section” is the time slot allocated to the midterms.

Attention: Students who are repeating 135bL must obtain written permission from the Undergraduate Office (in ACB439, physics@dornsife.usc.edu) in order to be excused from repeating the laboratory. A copy of the written memo must be turned in to the instructor *during the first week of classes*.

The Undergraduate Office in ACB439 deals with all administrative aspects of this class. Additional help regarding administrative issues is available from Giovanni Diaz in ACB 439 with phone number 213-740-7728 and email address giovannnd@usc.edu.

2.3 Disabilities

Students who need to request accommodation based on disability are required to register each semester with the Office of Student Accessibility Services (OSAS). This office can be found at GFS 120 with phone number 213-740-0776. **A letter of verification to the instructor from the OSAS is needed for the semester you are enrolled in. You must send your accommodation letter to the instructor as soon as possible. For exam related accommodations, you must send your letter to the instructor at least a week before the exam date.** If you have any further questions, please contact the OSAS (osasfrontdesk@usc.edu) or the instructor.

2.4 Academic integrity

The University of Southern California is foremost a learning community committed to fostering successful scholars and researchers dedicated to the pursuit of knowledge and the transmission of ideas. Academic misconduct is in contrast to the university's mission to educate students through a broad array of first-rank academic, professional, and extracurricular programs and includes any act of dishonesty in the submission of academic work (either in draft or final form).

This course will follow the expectations for academic integrity as stated in the [USC Student Handbook](#). All students are expected to submit assignments that are original work and prepared specifically for the course/section in this academic term. You may not submit work written by others or “recycle” work prepared for other courses without obtaining written permission from the instructor(s). Students suspected of engaging in academic misconduct will be reported to the Office of Academic Integrity.

Other violations of academic misconduct include, but are not limited to, cheating, plagiarism, fabrication (e.g., falsifying data), knowingly assisting others in acts of academic dishonesty, and any act that gains or is intended to gain an unfair academic advantage.

Academic dishonesty has a far-reaching impact and is considered a serious offense against the university. Violations will result in a grade penalty, such as a failing grade on the assignment or in the course, and disciplinary action from the university itself, such as suspension or even expulsion.

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

Please ask your instructor if you are unsure what constitutes unauthorized assistance on an exam or assignment or what information requires citation and/or attribution.

2.5 Sharing of course materials outside of the learning environment

USC has a policy that prohibits sharing of any synchronous and asynchronous course content outside of the learning environment, see The USC Student Handbook page 57:

“Notes or recordings made by students based on a university class or lecture may only be made and for purposes of individual or group study, or for other usual non-commercial purposes that reasonably arise from the student's membership in the class or attendance at the university. This restriction also applies to any information distributed, disseminated, or in any way displayed for use in relationship to the class, whether obtained in class, via email or otherwise on the internet, or via any other medium. Violations of this policy may subject an individual or entity to university discipline and/or legal proceedings.”

In particular, please note that posting homework assignments and/or exam problems for whatever purpose on commercial web sites, such as chegg.com, slader.com, coursehero.com and the like, or on any social media is a violation both of the academic integrity and of this copyright policy and may result in a failing grade in the course.

2.6 Feedback

Feedback regarding all aspects of these lectures is very much appreciated and welcome at any time. Please get in touch with your instructor via email, after lectures, or during office hours.

3. GRADING

Your grade will be determined according to the following key:

80% lectures:

10% Homework

15% Midterm 1

15% Midterm 2

15% Midterm 3

25% Final exam

20% laboratory

In order to receive a passing grade in the course (D or above) you must receive a **passing grade in both the lecture and the laboratory portions**. In addition, you must receive a **passing grade on the final examination**. Each semester a few students fail to complete the laboratory experiments and consequently fail the entire course. Please don't let this happen to you! If you miss a lab session due to some emergency, make sure to arrange a lab make-up session as soon as possible with your lab TA.

The average score for the laboratory part of the course is typically about 93/100. The average score for homework is typically 90/100. Broadly speaking, grading is done by the distribution curve of the combined scores of exams, homework, and lab. Further details about the grading procedure are given in class.

Extra credit opportunity

Researchers at University of Southern California, Texas State University, and University of Michigan are currently developing a new program to support college students in science and math classes, and students in this class are invited to help with this work! In this study, students will be led through online sessions in which they will be asked to examine their beliefs about their own motivation and learning behaviors in courses. If you choose to participate in this brief, online study, you will receive extra credit to your grade at the end of the semester. This study will increase your grade for the course by 1%. During the first week of class, you will receive an announcement about this study via Brightspace that includes more details and directions about how to register for the study.

3.1 Homework

Homework will be assigned regularly, roughly once per week, and is due on the assigned due date provided. An Assignment will be posted on Brightspace that details the homework problems/conceptual questions and will include the due date for that assignment as well as a submission upload link. There is also a calendar in Section 7 of this syllabus with the assignment due dates. The homework must be turned in via *Brightspace* by **11:59 PM (PST)** the day it is due. You must turn your assignment as a single PDF file on Brightspace. Do not attempt to submit JPEG files, which Brightspace will not accept.

No late homework is accepted. To accommodate unforeseen circumstances, we will cap the maximum score for the homework to be out of one less than the total number of assignments. For example, we anticipate there will be 10 assignments total each worth 80 points, so the maximum score for the homework will be 720 points if that is the case. *This is better than dropping the lowest score* since you can use all the assignments to reach the maximum score.

I expect that it will take several hours to complete each of your homework sets. The homework sets are the central means by which to master the course material, and, consequently, to perform well in the exams. "Understanding physics" does not mean knowing the words by heart and reading the textbook. "Understanding physics" implies the development of the necessary skills to solve physics problems you have not seen before. This means being able to translate real-life situations into the mathematical framework of physics, and making quantitative predictions which can then be related back to the real world. A common misconception is that physics is about "plugging numbers into formulas." In almost all

physics problems you will need to be able to combine several different physical and mathematical concepts in a novel way. The lectures and homework assignments are designed to help you achieve these goals and do well in the exams.

Homework problems will range from medium difficult to difficult. Midterm and final exam questions will resemble many of those problems. I urge you to attempt every homework problem, even if you are not able to complete each one.

I encourage you to discuss homework problems with your fellow students. This does not imply, however, simply copying solutions from each other. You can learn a tremendous amount by cooperating and explaining to each other how to analyze a problem, but everyone must turn in independently written solutions. Based on my previous experience, you will learn more physics, and earn a higher grade, if you take the homework problems as an opportunity to learn, which implies making mistakes! If you carefully review your mistakes after receiving the graded homework sets, you will be very unlikely to repeat the same mistakes in future (and, in particular, on the exams).

Solutions to the homework sets will be posted on *Brightspace* after the due dates.

3.2 Exams

There will be three midterm exams and a final exam. The midterms will cover the course material incrementally throughout the semester, and the final exam will cover the whole course.

Please carefully note the date and time of the midterms and the final examinations (see Sec. 7). No exceptions to these dates and times are allowed. If you have a conflict, please attend to it immediately.

There will be *no make-up exams given for any tests in this course*. A missed exam will prevent you from passing unless you have approval from your professor *before the exam* because of an *extreme* emergency.

3.2.1 Format of the exams

All exams will be in person. At the end of the exam, you will be asked to scan and upload your work for grading using the Gradescope application. Please download it to your mobile device and perform a practice run before the exam. More details about the exams will be provided in class.

3.2.2 Calculators and formula sheet

Only non-programmable calculators are allowed during exams. In order to free you to focus on “understanding physics” rather than “learning physics by heart” you will be given access to the collection of formulas for the exam, *i.e.*, a formula sheet. The formula sheet will also be posted on Brightspace before the exam. It is your responsibility to understand the meaning of the various symbols, and in what situations the different mathematical relationships apply (and in what situations they do not apply).

3.3 Laboratory

Physics is an experimental science and therefore the laboratory is a very important part of this course. Physics 135bL laboratories *will meet* during the first week of class. Each week you will be doing an

experiment. The laboratory policies are clearly spelled out in the **laboratory Brightspace course**. Read it carefully.

Read the description of the experiment carefully *before* coming to the laboratory. This will help you understand the experiment and you will be more efficient. You must complete the laboratory at the “Pass” level. Your laboratory grade will be derived from your lab quizzes and lab reports scores. *As noted previously, it is necessary for you to pass the laboratory portion of the course in order to pass the course as whole.*

If you miss a lab session it is your responsibility to make arrangements with your TA to make up the missing experiment. Your TA will not make that arrangement for you. *Do not simply attend another laboratory section unannounced. TAs will not accept students in the laboratory who are not registered in their section without prior official arrangements.*

Questions concerning the laboratory should be referred to the Instructional Laboratory Manager, Dr. Gökhan Esirgen (KAP B19; Email: esirgen@usc.edu).

4. SUPPORT

You have a variety of opportunities for support available to you. Here we list a non-exclusive set of these opportunities. Your home department may provide others.

4.1 Lectures

Do not underestimate the value of questions during the lecture period. In large lectures, many students are reluctant to pose questions which they fear might seem silly to their instructor or to their peers. Almost always, if one student asks a question, there are several other students who were wondering about the same issue. Often such questions tell the instructor what material might benefit from a more detailed discussion. Usually, a portion of each lecture will be devoted to illustrative examples, sometimes taken from previous homework sets, and questions help the instructor select those problems which you’ve had the greatest difficulties with. Some exam problems may closely resemble homework problems or problems discussed during lectures.

4.2 Laboratory TAs

All lab TAs are graduate students, usually pursuing a PhD in physics. They are all capable of answering any questions you might have regarding the course material covered in the lectures or in the lab. Usually, your lab TA can answer questions immediately. However, some problems you pose may require some additional thought. In either event, you should regard your TA as a resource not only for the laboratory but also for lecture-related questions.

4.3 TA office hours

All physics TAs have office hours in person for the assistance of students in 100-level physics courses. The TA office hours are posted on the *Department website*. TA office hours take place every day in the

morning and afternoon. Usually there is a different TA available each hour. Sometimes it helps to hear different people answer the same physics question, so if you feel that you did not understand the TA's explanation you might want to see a different TA on another day. *This is an excellent resource should you need immediate help.*

4.4 Instructor office hours

For more personal attention you can come to the office hours of your instructor listed on page 1 of this document. If you are unable to make these office hours, please feel free to contact your instructor *via email* to try to arrange some other time to meet. Please note, however, that your instructor's schedule will be very busy and, as a result, it may be difficult to find a time to meet outside regular office hours. Only rarely will it be possible to meet at less than a few days' notice, so please plan ahead to avoid disappointment.

4.5 Supplemental instruction

Supplemental Instruction (SI, <https://dornsife.usc.edu/supplemental-instruction>) is an academic program designed to improve the student's academic and increase retention. The SI program targets traditionally difficult courses and provides regularly scheduled, peer-led study sessions. These sessions are available to all students enrolled in the class at no cost. This program is brought to you by the Dornsife College. Please contact the SI instructor directly for further details. Still remember that your instructors and TAs should be the people to go to first if you don't understand something.

4.6 Published solutions

Solutions to all homework sets will become available at any time after you have submitted them for grading. Exam problems will closely resemble the ones from the homework assignments and/or examples discussed in class. You will also have access to examinations from previous semesters with their solutions. Sample exams should only be considered as samples illustrating the types of problems given in previous Physics 135bL exams.

5. ELECTRONIC COMMUNICATION AND ASSISTANCE

5.1 E-mail

E-mail is the most efficient method of contacting your instructor and lab TA outside of class. You can use e-mail to make appointments to speak privately with your instructor, or to just ask more physics questions. **Important: Use your USC email account.** Non-USC accounts cannot be authenticated and cannot be relied upon for any grade-affecting communication. E-mail from non-USC accounts may be blocked, deleted, or ignored.

5.2 Course website

Everyone registered in PHYS 135bL should find two separate “courses” already set up within their Brightspace account (<https://brightspace.usc.edu>), one for the lecture and a separate one for the laboratory. There you will find a copy of the syllabus, homework assignments, laboratory manuals and important news and announcements.

5.3 Monitoring your grades

Grades (numerical scores) from homework assignments, exams, and lab experiments will be posted on Brightspace. If you have any questions, complaints, or other issues regarding the grading, please contact your instructor or the lab director and *not* TAs.

6. SOME USEFUL DATES

August 26	Fall semester classes begin
September 2	Labor Day (University Holiday)
September 13	Last day to drop/add and change to Pass/No Pass
September 24	Midterm 1
October 10-11	Fall Break
October 11	Last day to withdraw without a “W” on transcript
October 22	Midterm 2
November 11	Veteran’s Day (University Holiday)
November 15	Last day to drop class with mark of “W”
November 19	Midterm 3
November 27-29	Thanksgiving Break
December 6	Fall semester classes end
Wednesday, December 11, 2 – 4 PM	Final exam

7. COURSE SCHEDULE

You should read through the relevant chapters prior to coming to the lectures each week and review them again after each lecture before attempting the homework problems.

Week	Start date	Chapter assignment and subject	HW #	Due date
1	8/26	Ch. 16: Electric Charge and Electric Field	1	9/4
2	9/2	Ch. 17: Electric Potential	2	9/11
3	9/9	Ch. 18: Electric Current and start of Ch. 19: DC Circuits	3	9/18
4	9/16	Ch. 19: DC Circuits and start of Ch. 20: Magnetism		
5	9/23	Review for midterm #1 and Ch. 20: Magnetism	4	10/2
Midterm 1 on 9/24 (5:00pm – 6:20pm): Chapters 16-19; Room TBD				
6	9/30	Ch. 21: Electromagnetic Induction and Faraday's Law	5	10/9
7	10/7	Ch. 22: Electromagnetic Waves	6	10/16
8	10/14	Ch. 22: EM Waves and start of Ch. 23: Light and Optics		
9	10/21	Review for midterm #2 and Ch. 23: Light and Optics	7	10/30
Midterm 2 on 10/22 (5:00pm – 6:20pm): Chapters 20-22; Room TBD				
10	10/28	Chapter 24: Wave Nature of Light	8	11/6
11	11/4	Chapter 25: Optical Instruments and start of Ch. 26: Relativity	9	11/13
12	11/11	Ch. 26: Relativity and Ch. 27: Early Quantum Theory		
13	11/18	Review for midterm #3 and Ch. 30: Nuclear Physics		
Midterm 3 on 11/19 (5:00pm – 6:20pm): Chapters 23-26; Room TBD				
14	11/25	Ch. 31: Nuclear Energy	10	12/4
15	12/2	Ch. 32: Elementary Particles and Review for Final Exam		
Final exam on 12/11 (2 pm – 4 pm): Chapters 16 – 32; Room TBD				

8. ACADEMIC CONDUCT SUPPORT SYSTEMS

8.1 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, (213) 740-1134, SSC 327).

8.2 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. You may contact OSAS at (213) 740-0776 or via email at osasfrontdesk@usc.edu.

8.3 Student Financial Aid and Satisfactory Academic Progress:

To be eligible for certain kinds of financial aid, students are required to maintain Satisfactory Academic Progress (SAP) toward their degree objectives. Visit the [Financial Aid Office webpage](#) for [undergraduate](#)- and [graduate-level](#) SAP eligibility requirements and the appeals process.

8.4 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. The Lifeline consists of a national network of over 200 local crisis centers, combining custom local care and resources with national standards and best practices. The new, shorter phone number makes it easier for people to remember and access mental health crisis services (though the previous 1 (800) 273-8255 number will continue to function indefinitely) and represents a continued commitment to those in crisis.

[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) 740-2500

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

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

Incidents of bias, hate crimes and microaggressions need to be reported allowing for appropriate investigation and response. studentaffairs.usc.edu/bias-assessment-response-support

Student Support and Advocacy – (213) 821-4710

Assists students and families in resolving complex issues adversely affecting their success as a student EX: personal, financial, and academic. studentaffairs.usc.edu/ssa

Diversity at USC

Information on events, programs and training, the Diversity Task Force (including representatives for each school), chronology, participation, and various resources for students. diversity.usc.edu

USC Emergency Information

Provides safety and other updates, including ways in which instruction will be continued if an officially declared emergency makes travel to campus infeasible. emergency.usc.edu

USC Department of Public Safety – UPC: (213) 740-4321 – HSC: (323) 442-1000 – 24-hour emergency or to report a crime. Provides overall safety to USC community. dps.usc.edu

9. Course Content Distribution and Synchronous Session Recordings Policies

USC has policies that prohibit recording and distribution of any synchronous and asynchronous course content outside of the learning environment.

Recording a university class without the express permission of the instructor and announcement to the class, or unless conducted pursuant to an Office of Student Accessibility Services (OSAS) accommodation. Recording can inhibit free discussion in the future, and thus infringe on the academic freedom of other students as well as the instructor. ([Living our Unifying Values: The USC Student Handbook](#), page 13).

Distribution or use of notes, recordings, exams, or other intellectual property, based on university classes or lectures without the express permission of the instructor for purposes other than individual or group study. This includes but is not limited to providing materials for distribution by services publishing course materials. This restriction on unauthorized use also applies to all information, which had been distributed to students or in any way had been displayed for use in relation to the class, whether obtained in class, via email, on the internet, or via any other media. Distributing course material without the instructor's permission will be presumed to be an intentional act to facilitate or enable academic dishonesty and is strictly prohibited. ([Living our Unifying Values: The USC Student Handbook](#), page 13).

10. Frequently asked questions about grading:

- *Is there a predefined grading scale?* **A:** We assign course grades at the end of the semester by examining the distribution curve of the full combined score (homework, midterm exams, final exam and labs). The demarcation points for specific letter grades are decided only at that time, not in advance.
- *Will any low homework or lab scores be dropped?* **A:** No, but the maximum score for the homework will be that of one less than the total number of assignments. This is better than dropping low homework scores.
- *How do I ask for a regrade of a homework or exam problem?* **A:** All regrade requests must be submitted *in writing within one week* after the graded work is returned to you. Send me a clear detailed explanation of why you think the grader missed some appropriate credit. Note that requests of the type "I think Problem 2 should be given more points, please check" will not be accepted.
- *I'm putting a lot of work and time into the class, shouldn't that by itself count for credit?* **A:** We are pleased to hear about your serious approach to studying. However – as generally is the case in life, for better or for worse – grades are based on performance, not merely effort (of course, the former will not come without the latter). But if we see improvement of your scores over the course of the semester, we'll definitely take that into account.