

PHYSICS 135BL: PHYSICS FOR THE LIFE SCIENCES II

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Office hours: TBD
and by appointment

Welcome to Physics 135BL! This is the second course in the 2-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 that affect a given situation.

1. COURSE MATERIALS

1.1 Required for lectures

Open Stax: College Physics (free textbook): <https://openstax.org/details/books/college-physics?Book%20details> . Can download a full PDF here.

1.2 Required for lab

General Physics Laboratory Manual (available online through the laboratory *Blackboard* page). **Questions concerning the laboratory should be referred to the Lab Director, Dr. Gokhan Esirgen (KAP B19; Email: esirgen@usc.edu).**

1.3 Suggested supplementary material (strictly optional)

- J. Boyle, *Physics: Student Guide with Selected Solutions*, 6th edition, Prentice Hall, 2004. *Study guide for the textbook by Giancoli.*
- Serway and Jewett, *Principles of Physics* (4th or 5th edition) or *Physics for Scientists and Engineers* (8th or 9th edition).

2. 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).

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 that, 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 Physics Office (in ACB439) 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 Physics Office in ACB 439 deals with all administrative aspects of this class. Additional help regarding administrative issues is available from Kimberly Burger burgerk@usc.edu in ACB 439

2.3 Disabilities

Students who need to request accommodation based on disability are required to register each semester with the Office of Disability Services and Programs (DSP). This office can be found at STU 301 with phone number 231-740-0776. **A letter of verification to the instructor from the DSP is needed for the semester you are enrolled in during the first week of class.** If you have any further questions please contact the DSP or the instructor.

2.4 Grading

Your grade will be determined according to the following key:

80% lectures:

10% Homework

20% Midterm 1

20% Midterm 2

30% 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. 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.

Broadly speaking, grading is done by the distribution curve of the combined scores of exams, homeworks and lab. No rigid percentage marks (such as, e.g., a rule that 90% corresponds to an A-, or similar) are used. Further details about the grading procedure are given in class.

2.5 Homework

Homework is assigned each week and is due **in lecture on Tuesdays**. The homework must be turned in **by the end of the lecture** in which it is due, *not* at the end of the day. *No late homework will be accepted. Please make sure to staple together multiple sheets. All work submitted as loose pages will not be graded.*

I expect that it will take several hours to complete each of your roughly 14 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 that 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 a 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 trivial to difficult. Midterm and final exam questions will resemble (and perhaps in some isolated cases even be identical to) 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 our 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, in the exams).

Solutions to the homework sets will be posted on *Blackboard* after the due dates. **I will automatically drop your two lowest homework scores, and therefore I will not be taking any late homeworks for whatever reason unless explicitly requested by a DSP accommodation.**

2.6 Exams

There will be two midterm exams and a final exam. The midterms will be given during the quiz section. The midterms will cover the course material incrementally throughout the semester, and the final exam will cover the whole course.

Please note carefully the date and time of the midterms and the final examinations (see Sec. 8). 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.

Previous semesters exams will be posted on blackboard to help you study. The best way to use them is to time yourself and try doing the best you can on the exam, and once the time is up, go over course material related to the questions you couldn't get, and if you still can't get them, look at the solutions.

2.7 Calculators and crib 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 may bring a 4"x6" index card, written on both sides, to each of the midterm exams. For the final exam, you are allowed one full 8.5"x11" sheet of paper, written on both sides. These sheets/cards must be in your own handwriting and cannot be photocopies/printouts. Don't copy out examples, only formulas.

2.8 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 have in the laboratory either a discussion meeting or an experiment. The laboratory policies are clearly spelled out in the introduction to the Lab Manual. 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 all laboratory assignments at the "Pass" level. Then your laboratory grade will be derived from laboratory quizzes, lab performance, the lab midterm, and the lab final. *As noted previously, it is necessary*

for you to pass the laboratory portion of the course in order to pass the course as whole, and to pass the lab you must complete all experiments.

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. TA's 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 Lab Director, Dr. Gokhan Esirgen (KAP B19; Email: esirgen@usc.edu).

3. SUPPORT

You have a variety of opportunities for support available to you.

3.1 Lecture

Do not underestimate the value of questions during the lecture period. In large lectures, many students are reluctant to pose questions that 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 that you've had the greatest difficulties with. Some exam problems may closely resemble homework problems or problems discussed during lectures.

3.2 Laboratory TAs

All lab TA's 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, either at the beginning or at the end of the lab period. 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.

3.3 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. TA office hours take place most days (usually Monday through Friday) and last for several hours each day. 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 a little bit later on the same day or on another day. *This is an excellent resource should you need immediate help.*

3.4 Instructor office hours

I will have five hours of office hours each week, but these office hours will be open to all of the courses that I teach. Office hours will be held in SHS 361. If a large number of students show up to office hours, we will also use the conference room in SHS 363, where I will entertain questions from students in a group setting. Most of my time is filled by teaching or office hours, but if I'm in my office, you're welcome to stop by for a quick question. You can also make an appointment to see me if you cannot make it to any of the office hours listed on the first page of the syllabus. In this case, it is best to contact me by email at least one day before you'd like to meet, or see me immediately after class. This semester I have 200 students so my apologies in advance if I'm not able to meet you outside my regular office hours / class time for some reason.

3.5 Electronic assistance

Everyone registered in this course should find a link to the course in their *Blackboard* account. All information about the course will be posted on *Blackboard* at

<http://blackboard.usc.edu>.

At this address, you will find this *Syllabus*, *important announcements*, *useful hints about some of the homework problems*, as well as *examinations from previous semesters*. Sample exams should only be considered as samples illustrating the types of problems given in previous Physics 135bL exams. Solutions to your homework sets (after the due date) will be placed on *Blackboard*.

4. OBTAINING YOUR GRADES

You will be able to access your grades in Physics 135bL via *Blackboard* at <http://blackboard.usc.edu>.

5. ACADEMIC INTEGRITY

Homework assignments may be discussed with other students, and help is available as noted above. *Under no circumstances should students seek out homework solutions from alumni of Physics 135bL or from any solution sets or manuals.*

Failure to abide by these rules will result in an automatic zero for the assignment involved and a report to the Office for Academic Integrity. Violations may also result in an F for the course.

An overview of the USC academic integrity policy may be found at

<http://www.usc.edu/student-affairs/SJACS/forms/AcademicIntegrityOverview.pdf>

As mentioned above, working hard on the homework sets is the best preparation for the exams. You would hurt yourself, as well as your fellow students, by cheating.

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.

7. STUDENT OMBUDSMAN

All courses in the Department of Physics & Astronomy have an assigned Student Ombudsman 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 Student Ombudsman for this course is Chris Gould, gould@usc.edu, 213-740-1101, SSC 204.

8. SOME USEFUL DATES

August 26 th	Fall semester classes begin
September 2 nd	Labor Day
September 13 th	Last day to drop class without a mark of “W,” and last day to change enrolment option
October 8 th	Midterm 1
October 17 th -18 th	Fall Recess
November 12 th	Midterm 2
November 15 th	Last day to drop class with mark of “W”
November 27 th - December 1 st	Thanksgiving holiday
December 6 th	Fall semester classes end
Tuesday Dec.17 th , 8am-10am	Final exam

9. 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. You should also attempt end of chapter problems from our textbook for extra practice (this will help a lot).

Chapter assignment and subject
Chapter 18: Electric Charge and Electric Field
Chapter 19: Electric Potential
Chapter 20: Electric Current, Resistance, and Ohm's Law
Chapter 21: DC Circuits
Chapter 22: Magnetism
Midterm 1 on 10/8 (5:00pm – 6:20pm): Chapters 18 – 22; Room TBD
Chapter 23: Electromagnetic Induction, AC Circuits
Chapter 24: Electromagnetic Waves
Chapter 25,26: Geometric Optics, Optical Instruments
Chapter 27: The Wave Nature of Light
Midterm 2 on 11/12 (5:00pm-6:20pm): Chapters 23-27; Room TBD
Chapter 28: The Special Theory of Relativity
Chapter 29: Early Quantum Theory and Models of the Atom
Final exam on 12/17 (8:00am-10:00am): Cumulative Exam; Room TBD