Physics Department
University of California, Berkeley
Physics 7C, Spring 2019

INSTRUCTOR: STEVEN STAHLER
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OFFICE: 395 LeConte
OFFICE HRS: Tu 10-11 am

LECTURE TIMES: TuTh 08:00 – 09:30AM

LOCATION: 4 LeConte

HEAD GSI: ROBERT MCGEHEE
EMAIL: robbiemcgehee@gmail.com

OFFICE: 109 LeConte
OFFICE HRS: MON 11:30 AM – 12:30 PM

TEXTBOOKS:

D. C. Giancoli, *Physics for Scientists and Engineers*, custom edition for the University of California, Berkeley. ISBN: 978-0-558-22904-7.

Serway, Moses & Moyer's, *Modern Physics,* 3rd edition, Cengage Learning, ISBN: 978-0534493394

Mastering Physics: https://www.masteringphysics.com/site/login.html

INTRODUCTION:

We will be covering optics, special relativity, and quantum physics in Physics 7C. Each of these subjects will each occupy about a third of the course. The sheer breadth of topics covered necessitates that we use two different texts.

For the first third of the course, where the focus will be on electromagnetic waves and their interaction with matter, we will be using five chapters from the third volume of the Giancoli textbook that was used in Physics 7A and 7B. For the rest of the course, we will focus on what is generally termed modern physics: special relativity and quantum theory. Here we will be using the first seven chapters in the textbook by of Serway et al. The presentation here is more detailed and at a deeper level than that in Giancoli.

The course is included in campus Course Capture program. This means the lecture will be recorded and you can find the course capture link on bCourses. Due to the budget issue, the record is audio only.

EXAMINATIONS:

There are three examinations scheduled for the course: two midterms and one final exam. These exams are designed to assess your **understanding** of physics, as oppose to your **knowledge** of the subject. As such, you will be asked to solve problems that you have never encountered before, either in your reading or in the homework.

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The dates and times for the three exams for the course have already been scheduled for the course, and are listed in the course syllabus. **Please mark these days down now. The midterms and the final cannot be made up if you miss one! You must take the final exam to pass the course.**

In Physics 7A and 7B it was often possible to make accommodations when scheduling conflicts for the evening midterms; students in one lecture section were allowed to take the midterm in another lecture section if necessary. There is only one section of Physics 7C, however. **As such, we cannot make accommodations for scheduling conflicts for Physics 7C, and all students must take their midterms on the scheduled day.**

EVALUATION OF STUDENT PERFORMANCE:

Your letter grade in this class will be evaluated using this weighting scheme:

Laboratory ……5%
Homework ……..10%
Midterm 1.. …….....25%
Midterm 2.. …….....25%
Final ……35%

In more detail, the last 35% of your class grade will be *either t*he final exam *or* a combination of the final (counting for 25%) and the average of the first two midterms (counting for 10%), whichever has the higher score. We offer this alternative so that you will not be excessively penalized if you have a bad day on the final. To determine your letter grade, we will be following the Physics Dept guidelines for lower-division courses.

HOMEWORK POLICY:

Physics is a subject learned by doing, and at this level, that means specifically doing homework. As a rule, problems will be assigned every Friday, and will be due by 5:00 PM the following Friday.

You will submit your weekly assignment using Mastering Physics, which you should have already used previously. In any case, you will need to register for Mastering Physics, by entering an access code that you have purchased before or will now. After registering, you will enter the course code. This is **MPSTAHLERS19**

Late homeworks are not allowed. However, the lowest homework scores will be dropped.

DISCUSSION SECTIONS:

Discussion and lab sections in Physics 7C are scheduled for once each week respectively. In weeks with a lab, there is a lab session that is three hours in length. In weeks with no lab, the GSI will hold a one-hour office at the beginning of the designated lab section. In the full discussion sessions, you will have an opportunity to ask about homework questions, as well as work through additional problems in much the same way that you used worksheets in Physics 7A and 7B. These problems will be posted in advance in Resources/DiscussionProblems. They are valuable practice, as problems of comparable difficulty will be appearing on the exams.

LABORATORY SECTIONS:

Unlike Physics 7A and 7B, laboratory sessions in Physics 7C are three hours long. There are, however, only six labs during the semester, and laboratory sessions only meet during these six weeks. Your scores on these labs

contribute 5% of your final grade. The dates on which these laboratory sessions are held are in the course syllabus. Please write these dates down now. **You are required to complete all the labs in the course; you may not drop any labs. For each missed lab that is not made up, your course grade will be lowered by one sub-grade, eg, an A- to a B+.**

In addition, please note the following:

- With the exception of the last lab, if you miss a lab for any reason, you are allowed to make it up no later than the *following lab week*. **You will not be able to make up the last lab, however.**

- Lab manuals are available at Copy Central on Telegraph. You must get a lab manual for the course, and we urge you to do so as soon as possible.

- You must finish the pre-lab questions for a given experiment *before* the lab session. GSIs will be collecting the answers at the beginning of each lab session. The pre-lab problems for each experiment are located toward the beginning of the relevant chapter in the lab manual. **Pre-labs count for half the points for the lab!**

- Lab write-ups are due by the end of the lab period, and should be no longer than 3 pages. Longer ones may receive deductions. **Write neatly.**

- On the lab write-ups, please put your name and SID number on each page. On the front page of the write-up, write your name, SID number, lab number, date, and your e-mail, lab section number and GSI. If you did your lab in a section other than your own, also write the lab section number, and GSI of that lab on your lab write-up.

- In grading lab reports, GSIs will adhere to the following rubric. This rubric will be applied separately for the lab and the prelab:

Score out of 5	**Metric**
5	Student shows mastery of material and answers all questions
4	Student shows good understanding, minor calculational mistakes.
3	Student shows good understanding of material with minor flaws, or omits one or two small parts in the writeup
2	Student shows working understanding, but with notable flaws; or,

	omits one or two large parts in the writeup
1	Student shows heavily flawed understanding of material, or omits a significant fraction of the writeup
0	Student did little or no work.

- If you absolutely cannot make your scheduled lab, you must attend an alternate session no later than the following *lab* week to complete the lab. When making up a lab please do the following:
    - Notify the GSI of your assigned lab section that you cannot attend that section. Give him the reason as well.
    - Find a lab session with open slots that fits your schedule.
    - Notify the GSI of the lab you wish to attend that you will be showing up.
    - After completing the lab, have the supervising GSI initial your report, then turn it in to your regular GSI, who will grade the report and record the grade.
- If you are more than 40 minutes late, you will have to make up the lab in the other section.
- **Please note that material from the laboratories may appear on exams.**

Physics 7C Syllabus: Stahler

Week of	Topics	Text Reading	Lab
Jan 20	Maxwell's Eqns and EM Waves Energy Flux	G: 31.1-31.6 G: 31.8-31.10	
Jan 27	Ray Optics; Reflection Refraction	G: 32.1-32.3 G: 32.4-32.7	Reflection and Refraction
Feb 3	Thin Lenses; Ray Tracing Lens Combinations	G: 33.1-33.2 G: 33.3, 33.5	Geometric Optics
Feb 10	Double-Slit Interference Diffraction; Resolution	G: 34.1-34.3 G: 35.1-35.4	Diffraction and Interference
Feb 17	Polarization Reference Frames and Einstein Postulates	G: 35.11 S: 1.1-1.4	Polarization
Feb 24	Lorentz Transformations Time and Length Transformations	S: 1.5 S: 1.6-1.7	**Midterm 1**
Mar 2	Paradoxes; Doppler Effect Momentum and Energy	S: 1.5 S: 2.1-2.2	
Mar 9	Four-Vectors Relativistic Dynamics	S: 2.3 S: 2.4	
Mar 16	Mass-Energy Conversion Blackbody Radiation	 S: 3.1-3.3	
Mar 23	**Spring Break**		
Mar 30	Photoelectric Effect; Compton Scattering Atomic Nucleus	S: 3.4-3.5 S: 4.1-4.2	**Midterm 2**
Apr 6	Bohr Atom Matter Waves	S: 4.3-4.4 S: 5.1-5.3	Photelectric Effect
Apr 13	1D Schrödinger Equation Square Well Solutions	S: 5.5-5.6 S: 6.4	Atomic Spectra
Apr 20	Expectation Values; Operators Wave Reflection and Transmission	S: 6.7-6.8 S: 7.1-7.2	
Apr 27	General Relativity Course Summary	S: 2.5	
May 13	**final exam**		

Midterm 1: Thursday, Feb 27, 7-9 pm, 60 Evans & 101 Moffett

Midterm 2: Thursday, Apr 2, 7-9 pm, 60 Evans & 101 Moffett

Final Exam: Thursday, May 14, 7-10 pm, 4 LeConte

The above topics and their dates may change. Be sure and check bcourses for updates.