Physics 153L: Fundamentals of Physics III
Optics and Modern Physics

Instructor Information
Prof. Jia G. Lu
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Course Information

Lectures:			
Prof. Lu	(50420) Mon, Wed, Fri	1:00 – 1:50pm	SLH 102
Dr. MacDonald	(50422) Tues, Thurs	2:00 – 3:50pm	SLH 100
Office Hours:			
Prof. Lu:	Wed	4:00 – 5:30pm	SSC 215B
Dr. MacDonald:	Tues	12:30 – 1:30pm	SHS 361
	Fri	10:30 – 11:30am	SHS 361
	Fri (general)	1:00 – 3:00pm	SHS 361
	or by appointment		
Quiz:	Thurs	5:00 – 6:20pm	

TA Information (Lecture and Lab)
TBA
General TA Office Hours: Mon – Fri, 10:00am – 5:00pm in ACB 431

General Course Information

Welcome to Phys 153! This is the third, and final, in a three semester sequence of courses on the fundamentals of physics, aimed for majors in the engineering and physical sciences. In this course we will focus on optics, introductory quantum mechanics, solid state physics, and special relativity. The pre-requisites for this course are Phys 151 and Phys 152, as well as Calculus III. You are expected to be able to apply concepts and problem solving skills from your previous physics courses.

Textbook: The assigned textbook for the course is *Physics for Scientists and Engineers, 3rd Edition* by Randall D. Knight. Some homework problems may be assigned from this textbook, so it is a good idea to have access to it. We will do our best to follow the structure of the textbook, as well as the notation; however, our lecture notes are not from the textbook. A textbook and a lecture should complement one another, and as such, you should read the relevant chapters in the textbook as we cover them. This provides you with an additional approach to the material, additional worked problems, and sometimes more (or less) exposition on topics than is given in class. We will not test you on anything that we have not covered in class; the purpose of reading the textbook is to supplement your in-class learning, not to replace it. That being said, you may or may not like this textbook. We encourage you to seek out other resources: other textbooks, online notes, YouTube videos, etc. The more resources you have the better able you will be to compile the facts and learn. Do be mindful of the accuracy of your sources, though.

Course Policies:

- **No electronic devices may be used during lecture.** Please keep your laptops, tablets, phones, etc., turned off (or on silent) and put away during class. If you have a disability that requires you to use an electronic device, please come talk to me and we will work something out.
- Attendance is not mandatory, but it is strongly encouraged. There will be both announced and unannounced quizzes that are worth a portion of your grade; **there are no make-up quizzes**. These effectively count as attendance, but more importantly serve to help you be on track with the course.
- **Attendance for the two midterms and the final exam is mandatory. There are no make-up exams.** If you have medical circumstances that prevent you from attending either of the exams, please speak to me about them ASAP. We will require a doctor's note.
- We use Blackboard to post homework assignments, homework solutions, additional documents, grades, etc. Make sure you have access to the course's Blackboard page.
- **Ask questions during lecture!** Do not hesitate to raise your hand and ask your questions during class. It is much better to ask right away than to wait until office hours – this is because there are likely other students who have the same or similar questions, and they can benefit from the answers. If you feel your question is better answered in a more personal setting, however, then please come see us during our office hours. You are also welcome to ask your lab TA questions during lab.
- The best way to learn physics is by doing problems. If nothing else, we strongly encourage you to attempt every single homework problem assigned, as well as some additional ones (feel free to pick random problems from the book!). We can honestly say that you will not learn this subject or do well in this course if you do not do the problems. If you do complete all of the homework, then you should be able to do well on the exams, and more importantly, come away having learned something.

Disabilities: Students who need to request accommodations based on disability are required to register each semester with the office of Disability Services and Programs (DSP). In addition, a letter of verification from DSP is needed for the semester you are enrolled in this course and is to be provided to me. If you have any questions concerning this procedure, please contact the instructor and DSP at STU 301 or phone 213-740-0776

Grading

Your overall course grade will be determined from the following distribution:

Homework	15%
Lab*	20%
Quizzes	5%
Midterm 1	15%
Midterm 2	15%
Final Exam	25%

*You must pass **both** the lecture and the lab sections of the course (independently) in order to pass the course overall. More below.

Homework: Homework will be posted on Blackboard on Wednesdays, and **due the following Wednesday for MWF Section 50420 (Prof. Lu) in-class at 1:00pm, and Thursday for TTh Section 50422 (Dr. MacDonald) in-class at 2:00pm**. Homework will be assigned weekly (see schedule below). It should be hand-written, and you must physically turn your homework in by the deadline. **No late homework will be accepted.** It must be your own work, however, we encourage you to work together with your fellow classmates – just don't copy each other's solutions!

Homework will be graded by the TAs (see above) and returned to you in a timely fashion. It will be placed in the mailboxes marked “Phys 153 HW Prof. Lu” and “Phys 153 HW Dr. MacDonald” in the 2nd floor hallway of SSC. You may collect it from that folder at any time, but please be respectful and keep the piles of graded homework neat and orderly.

Your lowest two HW grades will be automatically dropped at the end of the semester. This is to accommodate unforeseen circumstances, such as illnesses or travel.

Homework will be a combination of problems from textbooks and ones we write. They will range in difficulty from easy to hard, and the entire homework set should take you between four to five hours to complete each week. The questions on the exams will resemble the medium-to-hard homework problems. In addition, we may occasionally give "bonus problems" at the end of an assignment that are completely optional, but are good exercises to work through for extra practice, and will amount to extra credit.

Homework solutions will be posted on Blackboard on Friday mornings. Please read the solutions, as it is better to know whether or not you did a problem correctly as soon as possible after doing it.

Exams: There will be two midterm exams and one final exam. We will announce what material will be covered on the midterms, but it should follow the schedule below. The final exam will be cumulative. The exams are closed book, closed notes, and no electronic devices will be allowed, with the exception of a calculator of any kind… but you cannot use your phone as a calculator! **There are no make-up exams**.

The midterm exams will be held in rooms to be announced in class, and will take place during the scheduled quiz time (see above). The final exam for Phys 153 is listed under the "exceptional exams" for the University schedule; the location will be announced in class at the end of the semester. The dates are below:

Midterm Exam 1 – Thursday, February 9th 5:00 – 6:20pm
Midterm Exam 2 – Thursday, April 6th 5:00 – 6:20pm
Final Exam – Monday, May 8th 4:30 – 6:30pm

Quizzes: There will occasionally be quizzes given in-class, both announced and unannounced, throughout the semester. **There are no make-up quizzes**. The quizzes serve both to award points for attendance and, more importantly, to help keep you on track with the course.

Lab Information

In addition to the lecture, you must also be registered for a lab section of the course (and a quiz section). The information you need to know regarding your labs should be provided to you during your first lab meeting. You will receive an email from the lab director, Dr. Gökhan Esirgen, before the first lab with some important information.

The lab section uses Blackboard and it is listed separately from the lecture section. Please read all documents on Blackboard for the lab.

Be aware that you must pass the lab to pass the overall class. However, if you should withdraw from the class but choose to complete the lab, your lab grade can be held so that you do not need to take the lab section again. Speak to Dr. Esirgen about this if needed.

The lab will consist of weekly pre-lab quizzes, in-lab performance grades, and weekly experiment write-ups. Your lab TA will evaluate all three of these components and provide me with your grades at the end of the semester. I will then convert these scores to account for 20% of your overall course grade. If you have questions about how you are doing in the lab, ask your lab TA.

You must attend the first lab meeting in order to secure your spot in your lab section. You must also attend only your registered lab section. If you miss a lab, there are lab make-up policies explained on a document in Blackboard for your lab section about how to make it up.

Lab Director: Dr. Gökhan Esirgen
KAP B19
esirgen@usc.edu
(213) 740-1138

Important Dates for Spring 2017

Classes Begin	Mon	January 9
Martin Luther King's Birthday	Mon	January 16
Midterm Exam 1	**Thurs**	**February 9, 5:00 – 6:20pm**
President's Day	Mon	February 20
Last day to drop without "W"	Fri	February 24
Spring Recess	Sun-Sun	March 12-19
Midterm Exam 2	**Thurs**	**April 6, 5:00 – 6:20pm**
Last day to drop with a "W"	Fri	April 7
Classes End	Fri	April 28
Study Days	Sat-Tue	April 29-May 2
Final Exam	**Mon**	**May 8, 4:30 – 6:30pm**

Approximate Schedule and List of Topics

Week	Dates	Topics	HW # Due
1	1/9 – 1/13	Review of waves, interference, and diffraction	
2	1/16 – 1/20	**No class on Monday, January 16th – University Holiday** Wave optics, geometric optics, and optical instruments	1

3	1/23 – 1/27	Thermal radiation and Planck's postulate	2
4	1/30 – 2/3	Photoelectric effect and Compton scattering	3
5	2/6 – 2/10	**Midterm Exam 1, Thursday, February 9th, 5:00 – 6:20pm** De Broglie postulate and wave-particle duality	4
6	2/13 – 2/17	Bohr's model – Hydrogen atom	5
7	2/20 – 2/24	**No class on Monday, February 20th – University Holiday** Time-independent Schrödinger equations	6
8	2/27 – 3/3	Time-independent Schrödinger equations continued	7
9	3/6 – 3/10	Solid State Physics	8
	3/13 – 3/17	Spring Recess – No Classes	
10	3/20 – 3/24	Solid State Physics continued	9
11	3/27 – 3/31	Electrical Transport	10
12	4/3 – 4/7	**Midterm 2 Exam, Thursday, April 6th, 5:00 – 6:20pm** Electrical transport continued	11
13	4/10 – 4/14	Special Relativity	12
14	4/17 – 4/21	Special Relativity continued	13
15	4/24 – 4/28	Review	14
	5/8	**Final Exam 4:30 – 6:30pm**	