

Physics 21 – Spring 2018 (any Physics 19 students please see me ASAP)

Professor Jerome C. Licini, 610 758-5137, LL408, JCL3@Lehigh.edu, <http://www.lehigh.edu/~jcl3>.

Please record...

Recitation instructor and section number:

Their contact information:

Textbook and MasteringPhysics: 1) "University Physics, Volume 2," Hugh D. Young and Roger A. Freedman, Fourteenth Edition, Pearson Addison-Wesley, 2014 or 2016 (ISBN-13: 978-0-13-397800-1). You should feel free to use either a hardcopy or an electronic version (see below). 2) A subscription to the MasteringPhysics online homework system is **required** and can be purchased bundled with the textbook or subscribe on-line at <http://www.masteringphysics.com>. Please note that through this site you can also purchase access to an on-line version of the textbook if you prefer that to a hardcopy. 3) If you want additional resources, you might look into purchasing the Student Solutions Manual (978-0-13-396928-3) which contains full solutions for half of the odd-numbered problems or the Student's Study Guide (978-0-13-398360-9).

Reading Assignments are essential! Look through the chapter **before** the corresponding material is discussed in lecture, read in detail as needed to solve the problems.

Attendance at all course meetings is required for continued enrollment in the course under University policy (see section 3 of Rules and Procedures).

Online Homework (conceptual questions) will be submitted via MasteringPhysics. MP also includes "Tutorial" practice problems and "ExtraCredit" exam preparation practice problems. Access to all MP online activities will END at the start time for the Final Exam. To subscribe, please note that Lehigh's zip code is 18015, and the course id is PHYSICS21SPRING2018LICINI.

Written Homework will be submitted at the beginning of class. Keeping in mind that your goal is to be able to solve physics problems by yourself on the exams: 1) The assignments are graded primarily on whether you've made a serious effort instead of numerical accuracy, so it is far better to actually work on the problems than to copy somebody else's perfect solution, and 2) Start working on the assignments **early** so that if you get stuck, you have time to discuss the problems with your coursemates or email me.

Quizzes: Quizzes are given in recitation. The quiz questions are typically similar to homework problems. Missed quizzes count as a zero. Only your highest five quiz scores are used in the computation of your course grade, so no makeup quizzes will be offered.

Exams: Two midterm exams will be given during "4 o'clock quiz" weeks. The exams will be "closed book" but you will be supplied with equation sheets and you will receive information about bringing in a page of your own notes. The final exam will be cumulative.

Course Grading:	Midterm Exam 1 (Tues, Feb 27)	100	
	Midterm Exam 2 (Tues, April 10)	100	
	Written homework	80	
	MasteringPhysics online homework	50	
	Recitation Quizzes (best 5)	50	
	Recitation Attendance	20	
	Final Exam	200	
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	TOTAL	600	

(Athletes: Please send sports evaluation forms to your **recitation instructor** only.)

CONTENTS:

Physics 21 “Introductory Physics II” is the four-credit “content” portion of the second semester of Lehigh University’s calculus-based two-semester introductory physics sequence, designed primarily for science and engineering students. In Physics 21, we cover two broad subject areas, ELECTROMAGNETICS (including electrostatics, magnetostatics, electrodynamics, and circuits) and WAVES (including mechanical and electromagnetic waves, optics, diffraction and interference, and quantum phenomena).

Prerequisites/Corequisites: Physics 21 requires prior mechanics course credit (Physics 10 or 11) and prior second-semester calculus credit (Math 22, 32, or 52).

Other related courses: Physics 22 “Introductory Physics II Laboratory” is the separately-scheduled one-credit laboratory course, which should typically be taken during the same semester as Physics 21. Physics 23 is an alternative targeted towards physics and astronomy majors or minors interested in a relativity-based presentation. Students can stay in Physics 21 and can take just the relativity portion of 23 by adding the two-credit Physics 97. Physics 96 is an additional one-credit online option that parallels our course for students interested in advanced topics via independent study. Physics 13 “General Physics II” covers comparable material with a more biological orientation and somewhat lower math expectations.

Structure: During each of the 14 weeks in the semester, we meet for two 50-minute lectures (primarily content-delivery) and two 50-minute small-group recitations (primarily problem-solving practice, coaching, and evaluation).

FINAL COMPETENCIES:

- 1) Students demonstrate competence with the mathematical tools and techniques required (units, conversions, exponential notation, significant figures, algebra, quadratic equations, simultaneous equations, geometry, trigonometry, vector components, scalar and vector products, differentiation and integration of polynomial, trigonometric, and vector functions, and interpreting and creating graphs).
- 2) Students demonstrate competence at analyzing word problems into underlying physical principles, visual depictions, equations, and graphs as appropriate.
- 3) Students understand the relationships between sources and fields and can determine electric and magnetic fields.
- 4) Students understand the consequences of time-varying fields and can use them to analyze and predict induced electric and magnetic fields.
- 5) Students understand applying the above concepts to discrete circuits elements, and can use them to solve the overall behavior of DC, transient, and AC circuits.
- 6) Students understand wave principles and can use them to describe and predict the behavior of mechanical, sound, and electromagnetic waves.
- 7) Students understand the propagation of electromagnetic waves as manifested in geometric optics as well as polarization, interference and diffraction.
- 8) Students understand that wave phenomena apply to particles as well, and can understand basic quantum principles of photons, particles, and atoms.

CELL PHONES AND ELECTRONIC DEVICES:

During exams, absolutely no use of cell phones or other electronic devices. (This will be automatically treated as an academic integrity violation.) During lectures and recitations, please do not use your cell phone or other electronic device. (This is a distraction to yourself and others around you, as demonstrated by peer-reviewed research studies.) These course policies are backed up by official policy from the College of Arts and Sciences: “No cell phones, laptops, tablets, e-readers, MP3 players, calculators, or other electronic devices are allowed to be used during any class, quiz, or exam in the College of Arts and Sciences, unless otherwise specified by the instructor or authorized as an accommodation of disability. Electronic devices must be silenced and put away out of sight during class, unless their use is permitted.”

TUTORING RESOURCES:

The Dean of Students office is a great starting place for academic help! Their Center for Academic Success (<http://studentaffairs.lehigh.edu/success>) usually offers tutoring for Physics 21. Another resource is the Writing and Math Center in Drown Hall (<http://studentaffairs.lehigh.edu/node/1261>). The office hours of Physics 21 instructors will be posted so they can help answer questions from any Physics 21 student, although the students in their assigned recitations will be given priority. Some issues can be handled best by the University Counseling Service. Finally, I plan to run a weekly problem-solving workshop.

Accommodations for Students with Disabilities:

If you have a disability for which you are or may be requesting accommodations, please contact both your instructor and the Office of Academic Support Services, Williams Hall, Suite 301 (610-758-4152) as early as possible in the semester. You must have documentation from the Academic Support Services office before accommodations can be granted.

The Principles of Our Equitable Community:

Lehigh University endorses The Principles of Our Equitable Community (http://www.lehigh.edu/~inprv/initiatives/PrinciplesEquity_Sheet_v2_032212.pdf). We expect each member of this class to acknowledge and practice these Principles. Respect for each other and for differing viewpoints is a vital component of the learning environment inside and outside the classroom.

Religious holidays: (<https://chaplain.lehigh.edu/node/6>)

1. Inform your instructor that you will be absent from class due to observance of religious holidays.
 2. Arrange with the instructor to complete assignments or any required make-up work.
- (Dates for many religious holidays are posted on the Chaplain's web page listed above.)

Student Senate Statement on Academic Integrity: We, the Lehigh University Student Senate, as the standing representative body of all undergraduates, reaffirm the duty and obligation of students to meet and uphold the highest principles and values of personal, moral and ethical conduct. As partners in our educational community, both students and faculty share the responsibility for promoting and helping to ensure an environment of academic integrity. As such, each student is expected to complete all academic course work in accordance to the standards set forth by the faculty and in compliance with the University's Code of Conduct.

WE FULLY ENFORCE ALL UNIVERSITY STANDARDS FOR ACADEMIC INTEGRITY.

STATEMENT ON IRRESPONSIBLE ACADEMIC BEHAVIOR: (after Prof. Barry Bean, Biology)

There are many forms of irresponsible behavior that can ruin opportunities for you or for others in this course; there is no room and no excuse for bad behavior. Examples of irresponsible behavior cover a wide range, and include cheating, plagiarism, creating hazards or disruptions, slacking on responsibilities, unfairly exploiting the efforts of others, etc. Appropriate penalties should be expected. Offenders may lose points from their course totals, and serious offenders may be dropped from the course. Further explanation and guidelines on academic integrity at Lehigh can be found on the University Student Conduct System web page (<http://studentaffairs.lehigh.edu/conduct>) and on the Provost's Academic Integrity Site (<http://www.lehigh.edu/~inprv/faculty/academicintegrity.html>). It is firm policy in this course that cheating or plagiarism are unacceptable violations of academic integrity, and will earn an F as the semester grade in the course. **ALL EXAMS AND QUIZZES ARE REQUIRED TO BE STRICTLY YOUR OWN INDIVIDUAL WORK!**

HOMEWORK COLLABORATION POLICY: (after Prof. Edwin Kay, CSE)

Learning on homework assignments allows for healthy cooperation and collaboration. In grappling with the course work, the SHARING of ideas is educationally useful. The COPYING of ideas is destructive, fraudulent, and unacceptable. It is difficult to know where to draw the line between educationally useful sharing of ideas and the educationally destructive copying of ideas. I will paraphrase Roger D. Eastman of Loyola College (attributing the source material!): "I encourage you to help each other with homework assignments, but I also want you to understand where the help should stop. Don't take someone else's solution to copy or "for reference," or give yours for copying or "for reference." If you want to show someone your solution to illustrate the trouble you are having, that's fine; if you want to brainstorm about what the assignment requires and how to approach it, that's fine; if you want to share your knowledge of physics, that's fine; but letting someone copy your solution line by line, in fact or spirit, is not fine." Working together on troublesome areas, then continuing individually is a good technique. It is okay to tell the other person what is wrong and coach them toward solving the problem, but do not simply provide the correct equations.

Please note that the homework grading policy is designed so that making a serious attempt earns most of the points. In fact, indicating on your homework where you get stuck or have trouble will INCREASE the chance that you will get some notes of advice from the grader that will actually help you learn how to solve that type of problem. Submitting a copy of someone else's perfect solution will lead to LOWER exam scores since you will be unprepared to work the problems on your own.

PHYSICS 21 STUDY	Tues	Wed	Thurs	Fri	Sat-Mon
textbook reading assignment before lecture		30-50 minutes			30-50 minutes
review lecture notes, reread problem spots in text	10-20 minutes		10-20 minutes		
do online homework, set up each written HW problem	40-60 minutes		40-60 minutes		
complete HW problems, make a problem-solving checklist		40-60 minutes			40-60 minutes
reconcile with solution handout, finalize problem-solving checklist onto page of notes		15-20 minutes		15-20 minutes	
exam-conditions practice (only equation sheet and page of notes)					40-60 minutes
TOTALS	~ 1 hr	~ 2 hr	~ 1 hr	~ 0.5 hr	~2.5 hr

Grand total \approx 7 hours/week

Written HW assignments are NOT ENOUGH to develop fluency with exam problems!

Basic techniques: "Tutorial" assignments from MasteringPhysics

Exam preparation: "ExtraCredit" assignments from MasteringPhysics

Copies of "3000 Solved Problems in Physics" in Fair-Mart

Student Solution Manual > half of odd-numbered problems (ISBN 978-0-321-69668-7)

From my homepage: <http://www.lehigh.edu/~jcl3/index.html>

From Prof. Dan Stryer at Oberlin College are two excellent pages: "Study Tips for Introductory Physics Students" and "Solving Problems in Physics"