

Physics 21 – Summer 2018

(any Physics 19 students please see me ASAP)
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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. If you used the Young and Freedman textbook within the past semester or two, your subscription may still be valid, so try before you buy again! Otherwise, the lowest cost is usually subscribe on-line at <http://www.masteringphysics.com>. Beware purchasing this access from another vendor; many students have had trouble with this. 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! I recommend skimming the relevant sections **before** the material is discussed in lecture, then looking through the examples in detail as you work through the homework assignments. Alternate presentations of the material (youtube videos, simulations, etc.) are available in the "Links to external resource webpages" item on our CourseSite homepage.

Attendance at all course meetings is required for continued enrollment in the course under University policy (see section 3 of Rules and Procedures). Do NOT come to class if you have flu-like symptoms!

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 PHYSICS21SUMMER2018LICINI.

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 classmates or email me.

Quizzes: The quiz questions are typically similar to homework problems rather than exam-level 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: There will be two midterm exams and one final exam. 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. Cell phone use during exams is strictly prohibited! The Final Exam will have some cumulative component.

Course Grading:	Midterm Exam 1 (Mon July 16)	100
	Midterm Exam 2 (Mon July 30)	100
	Homework	100
	Quizzes (best 5)	50
	Final Exam (probably Fri Aug 10)	200
	<hr/> TOTAL	<hr/> 550

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 the six weeks of Summer Session 2, we meet Monday through Thursday from 9:30am-11:35am with a five minute break. The class period includes both content-delivery and problem-solving practice.

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>) may be able to offer tutoring for Physics 21. Another resource is the Writing and Math Center in Drown Hall (<http://studentaffairs.lehigh.edu/node/1261>). Some issues can be handled best by the University Counseling Service.

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.

Students sometimes attempt to maximize their homework points by copying someone else's perfect solution. It is far more important, however, to attempt the problems on your own, using hints that may be provided, since this will increase your capability to solve problems on your own during the quizzes and exams. (Quizzes and exams are worth 400 points compared to the 100 points for homework.)

PHYSICS 21 STUDY SUGGESTIONS: The standard guideline is that students should spend two to three hours studying outside class for every hour inside class. You should therefore expect to commit four to six hours per class day to study and homework, and then at least four hours over the weekend to exam conditions practice.

Here is a typical minimum sequence:

- skim textbook sections before lecture (20-30 minutes per day)
- review lecture notes, reread problem spots in text (15-20 minutes per day)
- do online homework, reading examples in detail as necessary (2 hours per day)
- make a problem-solving checklist for current problem types (10 minutes per day)
- reconcile back homeworks with solution handout (20 minutes per day)
- finalize problem-solving checklist from prior problem types onto page of notes (5 minutes per day)
- exam-conditions practice using only equation sheet and your page of notes (5 hours per week)

Recommended minimum of 20 hours per week.

Please be wary about making too many other commitments during these six weeks.

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/~jc13/index.html>

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