

Physics 11 – Fall 2021 (any Physics 9 students please see me ASAP)

Professor Jerome C. Licini, 610 758-5137, LL408, LL214A, JCL3@Lehigh.edu, <http://www.lehigh.edu/~jcl3>

Please record...

Recitation instructor and section number:

Their contact information:

Textbook: University Physics, Volume 1, by Hugh D. Young and Roger A. Freedman, Fifteenth Edition, Pearson Addison-Wesley, 2020. There is research that indicates that students learn and retain material better from paper textbooks, but you certainly may use either a hardcopy or an electronic version. If you buy some non-standard version, please make sure your purchase includes at least chapters 1-14 and 17-20. According to the pearson.com website, the loose-leaf paper copy of Volume 1 (Chapters 1-20) is available for \$165.32 as ISBN-13: 9780135216729. The most economical alternative would be a four-month subscription to the eText for 4× \$9.99 as ISBN-13: 9780136874331. (Optional: If this is your first-ever course in Physics, you may want to consider purchasing the \$53.32 Student Solutions Manual to Volume 1, ISBN-13: 9780135216958, which contains full solutions for most of the odd-numbered problems.)

Reading Assignments are essential! Look through the chapter **before** the corresponding material is discussed in lecture, read in detail after lecture 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).

Written Homework will be submitted at the beginning of lecture. 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. 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.

Quizzes: Quizzes are given in recitation. The quiz questions are typically similar to homework problems. Only your highest five quiz scores are used in the computation of your course grade. Missed quizzes count as a zero.

Exams: Two midterm exams will be given during "Common Hour Exam" 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. **Absolutely no cell phones** or other network-capable devices (iPad, eBook reader, Apple Watch, etc.) are permitted.

No makeups. Because we only use the top five quiz scores, one or two zeros from missed quizzes will simply be discarded. Missed midterm exam scores will be created using your score on the corresponding problems on the cumulative final exam. (This method yields a replacement score that can be accurately normalized to the performance of the class as a whole.) **Please reserve the midterm exam dates of 4:25-5:40pm on Wed Sept 29 and Wed Nov 3 on your calendar now.** Requesting a makeup for the final exam require supporting documentation, endorsement from the Dean of Students office, and a petition to the Committee on Standing of Students. Students with an unusually high level of medical issues or conflicts should contact Prof. Licini.

COMMUNITY EXPECTATIONS: To meet the challenge of teaching and learning during the COVID-19 pandemic, we as Lehigh instructors and students will be adopting new forms of instruction and interaction; following new guidelines around classroom behaviors; enhancing communications; and doing our best to be patient, flexible, and accommodating with each other. Lehigh has established a policy requiring everyone to **wear masks when in public spaces inside buildings on our campus and to maintain social distance. This policy applies to our physical classroom during lectures, recitations, exams, and office hours.** Thank you in advance for following this rule. Students who do not wear a face covering during in-class meetings will be reminded to put their face covering on. If they do not do so, they will be asked once again to do so or leave the classroom. For any online meetings, students are expected to attend just as they would any other Lehigh class. Zoom classes work best when all students come to class ready to participate and follow the instructor’s guidelines regarding use of web-cameras. You may be asked to turn your camera on during active learning sessions in Zoom. If you have a strong preference not to do so, please contact your instructor to let them know. (If you are worried about the view of the room behind you, you can upload a background photo.) Students should respect the in-classroom privacy of their instructors and fellow students by not taking screenshots or recording class sessions. Some instructors will record Zoom sessions; however, any recorded live sessions will be shared only with students in the class and will be deleted at the end of the semester.

Course grading: There is no Lehigh University standard mapping of percentages to letter grades! The curve will be set so that the average letter grade is approximately a B+. Rather than guess about your performance, please talk to your recitation instructor or Professor Licini.

Course Grading:	Midterm Exam 1 (Wed Sept 29)	100	
	Midterm Exam 2 (Wed Nov 3)	100	(Athletes: Please send sports
	Written homework	100	evaluation forms to your
	Recitation Quizzes (best 5)	50	recitation instructor.)
	Attendance	50	
	Final Exam	200	
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	TOTAL	600	

CONTENTS: Physics 11 “Introductory Physics I” is the four-credit “content” portion of the first semester of Lehigh University’s calculus-based two-semester introductory physics sequence, designed primarily for science and engineering students. In Physics 11, we cover two broad subject areas, MECHANICS (including kinematics, Newton’s laws, energy, momentum, rotational mechanics (kinematics / dynamics / energy / angular momentum), statics, gravity, and oscillations) and THERMODYNAMICS (including specific heat, latent heat, calorimetry, heat transfer, kinetic theory, the First and Second Laws of Thermodynamics, entropy, and application to thermodynamic machines).

Prerequisites/Corequisites: Physics 11 requires simultaneous enrollment in (or prior credit for) a first-semester calculus course from the set of Math {21, 31, 51, 75, or 76}.

Other related courses: Physics 12 “Introductory Physics I Laboratory” is the separately-scheduled one-credit laboratory course, which should typically be taken during the same semester as Physics 11. The second-semester continuation course which covers electromagnetism, waves, and optics is Physics 21 “Introductory Physics II” with its accompanying Physics 22 laboratory. An alternative course sequence, Physics 10 and 13 are offered with a more biological orientation and slightly lower math expectations.

Structure: During each of the 14 weeks, 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, basic differentiation and integration of polynomial and trigonometric 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 kinematic quantities and can use them to analyze and predict constant acceleration motion in one and two dimensions.
- 4) Students understand the different types of forces and Newton's Laws relating net force to acceleration and can use them to analyze and predict motion using free-body diagrams, including situations with friction and circular motion.
- 5) Students understand combining the basic quantities above into more abstract quantities of work, kinetic energy, potential energy, impulse, and linear momentum, and can use them to solve problems using conservation laws.
- 6) Students understand that the same principles of kinematics, dynamics, and conservation laws apply to rotational motion and can use them to analyze and predict rotational motion.
- 7) Students develop an appreciation for how basic physics principles are applied to more complex systems of statics, gravity, and oscillations as an example for their future professional work.
- 8) Students understand the macroscopic and microscopic nature of heat, its First and Second Laws, and the thermal properties of matter, and can use them to analyze cyclic processes of an ideal gas and thermodynamic machines.

Accommodations for Students with Disabilities:

Lehigh University is committed to maintaining an equitable and inclusive community and welcomes students with disabilities into all of the University's educational programs. In order to receive consideration for reasonable accommodations, a student with a disability must contact Disability Support Services (DSS), provide documentation, and participate in an interactive review process. If the documentation supports a request for reasonable accommodations, DSS will provide students with a Letter of Accommodations. Students who are approved for accommodations at Lehigh should share this letter and discuss their accommodations and learning needs with instructors as early in the semester as possible. For more information or to request services, please contact Disability Support Services in person in Williams Hall, Suite 301, via phone at 610-758-4152, via email at indss@lehigh.edu, or online at <https://studentaffairs.lehigh.edu/disabilities>.

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/religious-holidays-policy-and-calendar>)

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.)

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.

PHYSICS 11 – Tentative Schedule for Fall 2021

DATE	TOPIC	Corresponding READING
M Aug 23 (L1)	Rates: position, velocity, acceleration	2.0 to 2.3
Tu Aug 24 (R1)	Units, dimensions	1.0 to 1.6
W Aug 25 (L2)	Constant acceleration	2.4 to 2.s
Th Aug 26 (R2)	Vectors, hand back HW1	1.7 to 1.9
M Aug 30 (L3)	Motion in 2D and 3D	3.0 to 3.3
Tu Aug 31 (R3)	Hand back HW2	
W Sep 1 (L4)	Kinematics wrap-up, intro to Newton's Laws	3.4 to 3.s
Th Sep 2 (R4)	Hand back HW3	
M Sep 6 (L5)	Newton's Laws, force diagrams	4.0 to 4.s
Tu Sep 7 (R5)	Quiz 1 (on HW 1-3), hand back HW4	
W Sep 8 (L6)	More Newton's Laws	5.0 to 5.3
Th Sep 9 (R6)	Hand back HW5	
M Sep 13 (L7)	Paths, (centripetal acceleration)	5.4 to 5.s
Tu Sep 14 (R7)	Dot product, hand back HW6	1.10 to 1.s
W Sep 15 (L8)	Newton wrap-up, work and dot product	1.10 & 6.1
Th Sep 16 (R8)	Quiz 2 (on HW 4-6), hand back HW 7	
M Sep 20 (L9)	Work and kinetic energy	6.0 to 6.s
T Sep 21 (R9)	Hand back HW8	
W Sep 22 (L10)	Potential energy	7.0 to 7.3
Th Sep 23 (R10)	Quiz 3 (on HW 7-8), hand back HW9	
M Sep 27 (L11)	Energy wrap-up	7.4 to 7.s
T Sep 28 (R11)	Review	
W Sep 29 (L12)	Review, Midterm 1 @ 4:25 pm	review
Th Sep 30 (R12)	Hand back HW10	
M Oct 4 (L13)	CM motion, momentum	8.0 to 8.3
Tu Oct 5 (R13)	Return HW11	
W Oct 6 (L14)	Systems, collisions	8.4 to 8.s
Th Oct 7 (R14)	Quiz 4 (on HW 9-11), return Mid 1 & HW12	
M Oct 11	NO CLASS (Pacing Break)	a novel
T Oct 12 (R15)	Cross product	1.10 to 1.s
W Oct 13 (L15)	Rotation, energy	9.0 to 9.s
Th Oct 14 (R16)	Return HW13	

DATE	TOPIC	Corresponding READING
M Oct 18 (L16)	Torque, angular momentum	10.0 to 10.5
Tu Oct 19 (R17)	hand back HW14	
W Oct 20 (L17)	Angular momentum conservation	10.5 to 10.s
Th Oct 21 (R18)	Quiz 5 (HW 12-14), hand back HW15	
M Oct 25 (L18)	Statics	11.0 to 11.s
Tu Oct 26 (R19)	Hand back HW 16	
W Oct 27 (L19)	Gravitation and astronomy	13.0 to 13.s
Th Oct 28 (R20)	Review, hand back HW17	
M Nov 1 (L20)	Oscillations	14.0 to 14.s
Tu Nov 2	NO CLASS (Civic Engagement Day)	
W Nov 3 (L21)	Review, Midterm 2 @ 4:25 pm	review
Th Nov 4 (R21)	Hand back HW18	
M Nov 8 (L22)	Temperature, expansion	12.0-12.2, 17.0-17.4
Tu Nov 9 (R22)	Quiz 6 (HW 15-18), return Mid 2, HW19	
W Nov 10 (L23)	Heat capacity & transfer	17.5 to 17.s
Th Nov 11 (R23)	Hand back HW20	
M Nov 15 (L24)	Molecular properties	18.0 to 18.s
Tu Nov 16 (R24)	Hand back HW21	
W Nov 17 (L25)	Processes	19.0 - 19.7
Th Nov 18 (R25)	Quiz 7 (HW 19-21), hand back HW22	a novel
M Nov 22 (L26)	Heat Engines	19.8 – 20.3
Tu Nov 23 (R26)	Hand back HW23	
W-F Nov 24-26	NO CLASS (Thanksgiving vacation)	
M Nov 29 (L27)	Second Law, Carnot	20.4 – 20.6
Tu Nov 30 (R27)	Hand back HW24	
W Dec 1 (L28)	Entropy	20.8 – 20.s
Th Dec 2 (R28)	Quiz 8 (HW 22-24), hand back HW25	
Sat Dec 4 (R29)	RCS review session for recitation (or other date by mutual agreement)	
M Dec 6 (L29)	RCS review session for lecture	
Dec 7-15	Final Exam Scheduled by Registrar.	