PHYS 253 TLC – Fundamentals of Physics I: Mechanics
Fall 2017

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Text: Katz, *Physics for Scientists and Engineers: Foundations and Connections*, 1st Ed. (Cengage)

This is available as either a complete textbook, or split into two volumes. Either version will work (only volume 1 is needed for PHYS 253). If you purchase a printed copy of the textbook, make sure to get the "First Edition" (and not the "Advance Edition"). The online homework website includes an eBook version of the textbook, so a printed copy is not required. We will be using on online homework system called WebAssign (available at http://www.webassign.net). I have uploaded the class roster to WebAssign, so you should receive an email (sent to your NIU student email address) explaining how to log on. You need to purchase access to the website (you have a two week grace period). The bookstore should have WebAssign access cards for sale. You can also purchase access directly from the website.

Course description: PHYS 253 is the first semester of calculus-based general physics covering physical laws governing motion, force, energy, rotation, and vibration. There is one three-hour laboratory a week.

The MATH 229/PHYS 253 themed learning community is a unique opportunity for engineering students. Students are simultaneously enrolled in in both Calculus I and General Physics I and the course schedules have been adjusted to ensure that students have covered the needed topics in calculus. In addition, several special activities will occur during the semester.

Course objectives:

1. Student will be able to make measurements of physical quantities and use those measurements to describe the motion of objects in one dimension.
2. Students will be able to use vectors to describe the motion of objects in two dimensions.
3. Students will be able to use forces and Newton's laws of motion.

4. Students will be able to apply Newton's laws of motion to situations involving circular motion and gravity.
5. Students will be able to describe systems using work, energy, and the conservation of energy.
6. Students will be able to use linear momentum and the conservation of linear momentum to describe systems and collisions.
7. Students will be able to use angular momentum and the conservation of angular momentum to describe rotating and rolling objects.

Expectations:

Students are expected to attend both the lecture portion of the course (MWF 11-11:50am in Faraday Hall 129) and the lab section (W 3:00-5:40pm in Faraday Hall 233). All assignments need to be completed and turned in on time. Significant additional resources and help outside of class are available and as college students it is your responsibility to seek out these resources if you are having difficulty in the course. For example, there is a physics help room (Faraday Hall 251), your lab TA, and the peer leader for the course. Cell phones and all other electronic devices must be silenced during class.

Course information will be disseminated through the Blackboard site (http://webcourses.niu.edu).

Attendance:

Students are expected to attend all class meetings. If there are any extenuating circumstances, arrangements need to be made in advance of the absence with the instructor (for the lecture sessions) or the TA (for the lab section). Many studies have shown that the single biggest predictor of success in college is attending classes!

Assignments and Grading:

Your grade will be determined from a combination of in-class activities, homework, labs, quizzes, tests, and the final. There will be approximately one homework assignment, one in-class assignment, and several pre-lecture assignments per week. These assignments and the due dates will be announced in class and will be posted on blackboard. Each lab will have an associated assignment which is due at the beginning of the next week's lab session. There will be frequent in-class questions. These questions cannot be made up if you miss class. There will be three in-class exams during the semester. Finally, there is a comprehensive final exam.

Your final grade for the course will be made up of 25% for the lab portion and 75% for the lecture portion. The lecture portion of your grade will be composed of 30% from quizzes, homework, and in-class activities, 15% for each of the three tests, and 25% for the final.

IMPORTANT NOTE: YOU MUST PASS THE LABS TO PASS THE COURSE. THAT IS, YOUR CUMULATIVE SCORE ON THE LABS MUST EXCEED 60% OR YOU WILL RECEIVE A FAILING GRADE FOR THE COURSE.

The tentative grading scale will be:

A: 93% and higher
A-: 90-92%
B+: 87-89%
B: 83-86%
B-: 80-82%
C+: 77-79%
C: 70-76%
D: 60-69%
F: below 60%

Late assignments will be accepted up to two days (48 hours from the original deadline) late for a 25% penalty. Assignments will be accepted up to one week late for a 50% penalty. No assignments will be accepted more than one week after the original due date.

Themed Learning Community (TLC) Policy

This course is part of a Themed Learning Community, meaning it is intentionally paired with one or two other courses taken in conjunction with one another. It is required that you are enrolled in **ALL TLC** courses simultaneously in order to benefit from the unique learning opportunity created by these bundled courses. If, for some reason, you wish to drop one of your TLC courses, you must drop all of the courses that make up this TLC. Students are responsible for seeking additional guidance from their TLC instructors or the Office of Student Engagement and Experiential Learning (OSEEL) regarding possible withdrawal from TLC courses. Along with the benefits of integrative coursework, TLC students will also benefit from additional mentoring, academic support, and additional co-curricular opportunities.

Course Schedule

This schedule is tentative and subject to change.

Week	Topic	Chapters	Lab	
Week 1 Aug 28	Measurement, units, motion	1, 2	Sig Figs and pre-assessment	
Week 2 Sep 4	1D motion	2	Propagation of Errors	*Labor Day*
Week 3 Sep 11	Vectors, 2D motion	3, 4	Sky Scraper	
Week 4 Sep 18	Projectile motion, relative motion	5	Coin Toss	
Week 5 Sep 25	Forces, Newton's Laws	5	Incline	
Week 6 Oct 2	Friction, Equilibrium	6	Projectile	Test 1
Week 7 Oct 9	Circular motion, torque	6, 12	Pulley	
Week 8 Oct 16	Statics, gravity	7, 14	Axle	
Week 9 Oct 23	Work, energy	8	Weightlessness	
Week 10 Oct 30	Conservation of Energy	8, 9	Pendulum	Test 2
Week 11 Nov 6	Momentum conservation	10	Ballistics	
Week 12 Nov 13	Collisions, center of mass	11	Collisions	
Week 13 Nov 20	Angular motion, rotational energy	12, 13	*No lab*	*Thanksgiving*
Week 14 Nov 27	Angular momentum	13	Wheel (part 1)	Test 3
Week 15 Dec 4	Pressure, fluids	15	Wheel (part 2), post-assessment	
Finals Dec 11				Final scheduled Weds, Dec 13 from 10-11:50am

Accessibility: If you need an accommodation for this class, please contact the Disability Resource Center as soon as possible. The DRC coordinates accommodations for students with disabilities. It is located on the 4th floor of the Health Services Building, and can be reached at 815-753-1303 (V) or drc@niu.edu.

Also, please contact me privately as soon as possible so we can discuss your accommodations. The sooner you let us know your needs, the sooner we can assist you in achieving your learning goals in this course.

Academic Integrity: As detailed in the current NIU undergraduate catalog: *Good academic work must be based on honesty. The attempt of any student to present as his or her own work that which he or she has not produced is regarded by the faculty and administration as a serious offense. Students are considered to have cheated if they copy the work of another during an examination or turn in a paper or an assignment written, in whole or in part, by someone else. Students are responsible for plagiarism, intentional or not, if they copy material from books, magazines, or other sources without identifying and acknowledging those sources or if they paraphrase ideas from such sources without acknowledging them. Students responsible for, or assisting others in, either cheating or plagiarism on an assignment, quiz, or examination may receive a grade of F for the course involved and may be suspended or dismissed from the university.*

A faculty member has original jurisdiction over any instances of academic misconduct that occur in a course which the faculty member is teaching. The student shall be given the opportunity to resolve the matter in meetings with the faculty member and the department chair. If the facts of the incident are not disputed by the student, the faculty member may elect to resolve the matter at that level by levying a sanction no greater than an F for that course. The faculty member shall notify the student in writing whenever such action is taken, and the ***Office of Community Standards and Student Conduct*** *shall receive a copy of the* Academic Misconduct Incident Report*indicating final disposition of the case, which will be placed in the student's judicial file. In all matters where the charge of academic misconduct is disputed by the student or if the faculty member feels a sanction greater than an F in the course is appropriate (such as repeated offenses or flagrant violations), the faculty member shall refer the matter to the Office of Community Standards and Student Conduct making use of the* Academic Misconduct Incident Report. *Additional sanctions greater than an F in a course can be levied only through the University Judicial System. With regards to finding the student either responsible or not responsible for his or her action, the ruling of the Judicial Hearing Board shall be binding. In cases where there is either a finding of responsibility or an admission of responsibility by the student, any recommendations by the hearing board regarding the course grade are non-binding on the instructor, who remains solely responsible for assigning a course grade, consistent with the policies set forth in the course syllabus.*