

FOURTH EDITION  
**PHYSICS**  
for  
SCIENTISTS & ENGINEERS  
with Modern Physics



GIANCOLI

Fall Semester 2014  
11:00 am – 12:15 pm  
Tuesday and Thursday  
McMurry 201 (Lecture)

# Physics 253, Mechanics



**Prof. Young-Min Shin**  
**Physics Department**  
**Northern Illinois University**



## **Course Information**

- Designator/Number: Fundamental of Physics I (Mechanics) - PHYS 253 (Undergraduate)
- Course Title: Mechanics (Lecture)
- Credit Hours: 4
- Classroom Location: McMurry-201 (Lecture)
- Class Hours: 11:00 am – 12:15 pm
- Office Hours: 10 – 11 am, Tuesday and Thursday

## **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.



# *Interaction with Instructor*

## Contact Information

- Instructor: Prof. Young-Min Shin
- Office Location: Faraday West 206
- Office Telephone: 815-753-6456 (NIU), 630-840-8478 (Fermilab)
- Email Address: [yshin@niu.edu](mailto:yshin@niu.edu), [youngmin@fnal.gov](mailto:youngmin@fnal.gov), and [alcolpeter@gmail.com](mailto:alcolpeter@gmail.com)
- Office Hours: 10 – 11 am, Tuesday and Thursday, by Appointment
- Preferred Method of Contact: email
- Prof. Shin's Professional Website:
  - <http://www.linkedin.com/pub/young-min-shin/58/2a3/56>
  - <http://alcolpeter.wix.com/niuopticslab>
  - <http://www.physics.niu.edu/physics/directory/faculty/Shin.shtml>

I try to respond to email daily, Monday through Friday. Generally, expect to receive a response to most weekday email within 24 hours. On weekends, I cannot guarantee a response to email.

**So, that I can recognize email message from you, I ask that you type "PHYS 253/your name" in the subject box of every email you send to me. It's possible that I may not read your email message without this information. Please use a proper greeting and sign your name to all email message you send to me.**



# ***Course Objectives***

## **The Physics 253, Fundamental of Physics-I, Mechanics will**

- 1. provide ways of measuring physical quantities and using the measurements to describe the dynamics in one dimension.**
- 2. help you to use vectors to describe the two-dimensional motions of objects**
- 3. teach you in forces and Newton's laws of motion.**
- 4. give a chance to learn Newton's laws representing circular motion and gravity.**
- 5. describe systems based on work, energy, and the conservation of energy.**
- 6. explain how linear momentum and the conservation of linear momentum are connected to systems and collisions.**
- 7. describe angular momentum and the conservation of angular Momentum to describe rotating and rolling objects.**



# ***Additional Requirements***

## **Required Media and Technology Access**

- Novell Login ID and student Z-ID number
- Course ID and Student ID to Access Mastering Physics Website

## **Instructional Approach**

- The preferred method of teaching consists of a variety of instructional techniques including lecture and lab exercises. The course will begin each class with lectures on each topic and follow-up quizzes.

## **Course Homepage**

- We will be mainly interacting through the “Mastering Physics” Website that already has many resources for the course. The website is often updated, so the students will need to keep monitoring it over the semester. You will be asked to work on homework through the website

## **Blackboard**

- Blackboard (Bb) is the online course management system (CMS) that we will be using extensively throughout the semester. Several course documents are available on our course site and others will be available at different times throughout the semester.



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# Books for Bed Time Reading

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G I A N C O L I

Required Textbook:

Giancoli, Physics for Scientists  
And Engineers, 4<sup>th</sup> Ed. (Pearson)

This is available as either a complete  
textbook, or split into several  
volumes.

Either version will work (volume 1 will be  
used for PHYS 253, volume  
2 will be used for PHYS 273, and volume 3  
will be used for PHYS 283).



Your grade will be determined from a combination of homework, labs, quizzes, tests, and the final. There will be approximately one homework assignment 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. Every week, during one of the lecture sessions there will be a short quiz.

These quizzes 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.

The approximate breakdown of how your grade will be determined is as follows:

Homework: 150 points (15 assignments @ 10 points each)

Labs: 180 points (12 labs @ 15 points each)

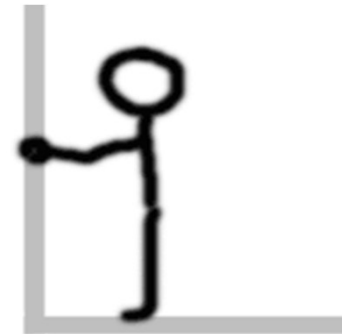
Quizzes: 75 points (15 quizzes @ 5 points each)

Tests: 300 points (3 tests @ 100 points each)

Final: 100 points

Total: 805 points

Note that this is tentative and subject to change.



Grading Scale:

A = 95 - 100%, B+ = 90 - 94.9 %, B = 85 - 89.9 %, B- = 80 - 84.9 %, C+ = 75 - 79.9 %, C = 70 - 74.9 %, D = 60 - 69.9 %, F = 0 %

**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.**

Grades will be posted on Blackboard.





# Course Policies

**In-Class Exercises and Attendance.** You should come to class because there's a lot that I'll say that won't be in the Power Point files, which will be on the tests. In the past, people who have skipped a lot of classes have received very bad grades. Conversely, people who've come to most or all of the classes nearly always receive A's and B's. **Please note: in-class exercises cannot be made up. It would be in your best interest, therefore, to regularly attend class! There will be no one-on-one instruction for a missed class.**

**Participation and Classroom Demeanor.** Students are expected to attend both the Lecture portion of the course and the lab section. All assignments need to be completed and turned in on time. Significant additional resources and help outside of class is available and as college students it is your responsibility to seek out these resources if you are having difficulty in the course. Cell phones and all other electronic devices must be silenced during class. please ask questions and be prepared to speak when called upon. Even though classroom participation does not count toward the final grade I expect that your participation and demeanor be active, helpful, and respectful of peers, the instructor, and guest speakers, if any.

**Late Work.** Homework/lab report will be **firmly** due on its due date. Late Homework/lab report will be accepted but with a 25% penalty per week. Assignments turned in up to two weeks late will be accepted with a 50% late penalty. No late assignments are accepted after two weeks. You can work with others on homework but write it up yourself with your own words. Explain your work. I'll drop your lowest homework score, so if you have a bad week, don't sweat it.

**Tardiness.** If you personal an/or professional schedules prevent you from regularly arriving to class on time, please discuss this with the instructor immediately. Being tardy twice (15 minutes or more late) will reduce total earned by 5 points for each late arrival thereafter.





# Course Policies

**Academic Integrity.** If you are “caught” in any act of academic dishonesty in this course, no matter your total points earned for the course at the end of the semester, your final grade will be reduced by ***at least one letter grade.***

Good academic work must be based on honesty. The attempt of any student to present as his her own work that which he or she has not produced is regarded by the faculty and administration as a series offense. Students are considered to have cheated if they copy the work of another during an examination or turn in a paper or 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 (2010/2011 NIU Undergraduate Graduate Catalog, (<http://catalog.niu.edu/cotent.php?catoid=14&navoid=413> )



# Tentative Timeline (PHYS-253, 2014)

*This curriculum schedule can change depending on the progress of the class*

Week	Date	Topic	Chapter	Lab	
1	Aug. 26, 28	Measurement, Unit, Motion	1, 2	None	
2	Sept. 2, 4	1D Motion	2	Sears Tower	Labor Day
3	Sept. 9, 11	Vectors, 2D Motion	3	Error Analysis (P)	
4	Sept. 16, 18	Projectile Motion, Relative Motion	3	Gravity Slide	
5	Sept. 23, 25	Forces, Newton's Laws	4	Projectile Motion	Test-1
6	Sept. 30, Oct. 2	Friction, Equilibrium	5	Weightlifting (P)	
7	Oct. 7, 9	Circular Motion, Torque	5 (10)	Atwood Machine	
8	Oct. 14, 16	Statics, Gravity, Harmonic Motion	6 (12, 14)	Centripetal Force	
9	Oct. 21, 23	Work, Energy	7, 8	Pendulum	
10	Oct. 28, 30	Conservation of Energy	8	Space Station (P)	Test-2
11	Nov. 4, 6	Momentum, Collisions	9	Ballistic Pendulum	
12	Nov. 11, 13	Momentum Conservation, Center of Mass	9	Collisions	
13	Nov. 18, 20	Angular Motion, Rotational Energy	10	The Waiter (P)	
14	Nov. 25, 27	Angular Momentum	11	None	Test-3 (Thanksgiving)
15	Dec. 2, 4	Pressure, Fluids	13	Rolling	
16	Dec. 9, 11	Finals			Final



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*Understanding the ideas of each lecture requires the knowledge of the previous lectures.*

**If you keep up, you won't end up looking like this the night before the tests!**

