

# **Physics 253 Honors (Fall 2017)** **(4 Credit Hours)**

## **Fundamentals of Physics I**

**Syllabus available on BlackBoard**  
**<http://webcourses.niu.edu/>**  
**under Course information**

# Blackboard

- Blackboard is an integral part of this course.
- Announcements will be made in class and/or blackboard.
- Documents and grades will be posted on blackboard.
- You are responsible for all that is posted on blackboard
- Please do not ignore emails that I send you through blackboard. Read them in a timely manner.

- **Name:** Prof. Omar Chmaissem (sha-my-sim)  
(You can call me Omar)
- **Email:** Chmaissem@niu.edu **Preferred method**
- **Fax:** (815) 753-8565

**DO NOT USE my Argonne National Lab Email Address (anl.gov). I will not reply to these emails.**

- **We will meet three times a week in FW 201:**  
**Monday, Wednesday, and Friday**  
**from 9:00 to 9:50 AM**
- **Office hours (FW 210) Subject to change:**  
**On most meeting days, I will be available most of the morning until about noon. Please see me for other meeting times as needed.**

# Lab Sections

- Labs are 2 hrs 50 min long.
- Separate Lab Rules and instructions will be covered by your TA's.
- Main lab related questions and issues need to be sorted out with your TA's. Please see me when you couldn't resolve your issue with your TA or if he/she are irresponsive.

# Lab Project and Video

- You will be joining the regular PHYS 253 lab sections and will do the same lab sets; however, you will also be responsible for a lab project, related to the content of this course, of your own design and execution (search the internet and YouTube for many great ideas). This is not a high school project so only serious experiments may be considered.
- This project will count for 200 points or as much as two regular labs worth.
- **Project Deadlines:**
  - Project idea must be presented in writing and approved by me no later than Friday, September 29.
  - As much as we can, we will try to secure the needed equipment for your experiment but you may have to purchase your own components if no NIU supplier is available or if you missed deadlines. Components must be acquired and demonstrated by the week of October 9.
  - The experiment has to be performed, videotaped and submitted no later than the week of November 6. You must appear performing the experiment in the video.
  - With your written permission, I may upload your videos to a special YouTube Channel.
- **Penalties:** Each missed deadline will result in an automatic 30% deduction.

- **Required Textbook:**

**Physics for Scientists and Engineers with Modern Physics: 4<sup>th</sup> Edition Giancoli. (volume 1 - Chapters 1-20).**

**Only chapters 1-15 are needed.**

**or  
the Full version of the book.**

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



G I A N C O L I

## Grade determined by:

- Homework: 0%
- Quizzes: 10%  
These could include pop quizzes, online quizzes, spot checks for attendance, etc.
- Tests (3 - 4): 45%  
**Tests are cumulative.** Dates will be announced in class and/or through blackboard. **No make up tests for any reason.** Tests cannot be taken at times other than the class test time (DRC exceptions).
- Lab: 20%  
(a minimum average lab grade of 60% is required. You will **fail** the course if your lab score is below this mark.) Likewise, you will **fail** the course if you don't satisfy all coursework requirements as described here and throughout the syllabus. Make sure you check your report(s) in a timely manner (Lab schedule and lab rules will be separately posted on Blackboard). In addition to the regularly scheduled labs, you are required to fully perform the lab project as described earlier.
- Final exam: 25%  
A final exam score of less than 50% will result in failing the class if your Test average is less than 60% regardless of your overall grade.

**(Wed. December 13, 8-9:50 AM)**



- **Note 1:** Deadlines are **RIGID**, no late assignments will be accepted.
- **Note 2:** HW assignments will not be graded.
- **Note 3:** It's your responsibility to solve and understand all solved strategic examples and problems found within each chapter  
You are responsible for all equations derived in these problems.
- **Note 4:** There will absolutely be no make-up tests. Likewise tests cannot be taken at a different time for whatever reason. However, in the case of convincing and well-documented emergencies, the missed test grade may be waived, however, do not assume this is automatic. I have to see a convincing evidence that the emergency is real. I have seen before fake doctor's or nurse's notes and I know how to distinguish real from fake. Contested evidence may be referred to the University Judicial Office for final judgment.
- **Note 5:** Final exam may be rescheduled only in case of a well-documented and convincing emergency.

- **Note 6:** No newspapers or electronic devices of any kind (Cell phone, MP3 player, IPod, etc) allowed during class time (i.e., during lectures, tests, etc). Small laptops maybe accepted if for using the electronic version of the book but the user must sit in the front rows. No electronics allowed on the tests and final exam other than a calculator.
- **Note 7:** You will fail the test if any device other than a calculator is seen with you during the test. Please make sure that such devices are stowed away. Please avoid embarrassing yourself and placing me in a bad situation.
- **Note 8:** **Cheating and plagiarism are serious offenses.**  
**Zero Tolerance Policy.**

We will be using SafeAssign/ which determines if any reports (partially or entirely) have been copied from the manual, from others (including students from previous semesters) or from the internet.

**Offenders will be referred to the University's Judicial Office.**

# Grading Scale

Your final letter grade for the semester will be determined based on the following scale:

<b>A</b>	<b>93 – 100%</b>
<b>A<sup>-</sup></b>	<b>90 – 92.99%</b>
<b>B<sup>+</sup></b>	<b>87 – 89.99%</b>
<b>B</b>	<b>83 – 86.99%</b>
<b>B<sup>-</sup></b>	<b>80 – 82.99%</b>
<b>C<sup>+</sup></b>	<b>74 – 79.99%</b>
<b>C</b>	<b>70 – 73.99%</b>
<b>D</b>	<b>60 – 69.99%</b>
<b>F</b>	<b>0 – 59.99%</b>

# *Course content*

**Chapters 1 through 15**

## Part I - Kinematics

### *Kinematics in one-dimension:*

Reference Frame and displacement, average velocity, acceleration, motion at constant acceleration and freely falling objects.

### *Kinematics in two or three dimension; vectors:*

Vectors and scalars, addition of vectors, subtraction of vectors, multiplication of a vector by a scalar, adding vectors by components, unit vectors, vectors kinematics and projectile motion.

## Part II- Dynamics

### ***Newton Laws of Motion:***

Force, Newton's laws of motion, body diagrams, weight and normal force.

### ***Friction, Circular Motion, Drag Forces:***

Applications of Newton's law, uniform circular motion, dynamics of circular motion and highway curves.

### ***Gravitation:***

Newton's law of universal gravitation, gravity near the Earth's surface, satellites, weightlessness, Kepler's law and Newton's synthesis, type of forces in nature, gravitational fields and the principle of equivalence.

## Part III – Work, Energy, momentum and Conservation Laws

### *Work and Energy:*

Work done by a constant force, scalar product of two vectors, work done by a varying force, kinetic energy and the work energy principle.

### *Conservation of Energy:*

Conservative and non-conservative, potential energy, mechanical energy and its conservation, the law of conservation of energy, energy conservation with dissipative force, gravitational potential energy, escape velocity and power.

### *Linear Momentum:*

Momentum and its relation to force, conservation of momentum, collision and impulse, conservation of energy, momentum in collisions, elastic and inelastic collisions, collisions in two or three dimensions, center of mass and translational motion.

## Part IV – Rotation, Angular momentum and equilibrium

### ***Rotational Motion:***

Angular quantities, vector nature of angular quantities, constant angular acceleration, torque, rotational dynamics, moments of inertia and rotational kinetic energy.

### ***Angular Momentum:***

Angular momentum, objects rotating about a fixed axis, vector cross product, angular momentum of a particle, torque for a system of particles, torque for a rigid object and conservation of angular momentum.

### ***Static equilibrium:***

The conditions for equilibrium, solving statics problems, stability and balance.



# Learning Objectives

At the end of the semester, students are expected to be able to:

- 1) Apply the basic laws of physics in the areas of kinematics, dynamics, gravitation, work, energy, momentum, rotational motion and conservation laws.
- 2) Analyze and solve problems or situations involving fundamental physics principles in the areas of kinematics, dynamics, gravitation, work, energy, momentum, rotational motion and conservation laws.
- 3) Strengthen their understanding and intuition of basic concepts in Mechanics.
- 4) Present physical concepts, sound mathematical reasoning and the results of laboratory experiments through effective writing skills.
- 5) Use laboratory data analysis techniques like error propagation, data acquisition, data plot and graphical analysis.
- 6) Constructively question results presented by the scientific community and engage in a reasonable debate on the facts of the issue.
- 7) Gain experience at relating physics concepts to real-world applications

# More Important Notices

- This is a tentative Syllabus which is subject to change whenever needed or required. You will be informed in class if any modifications are warranted. **Grading Scheme will not change unless there are typos (also see next notice).**
- Syllabus and grading scheme are designed for students completing the full semester. Withdrawal grades may be calculated differently. Please consult with me before withdrawing.
- If dropping the course, please make sure you do so before the official deadline; otherwise, a WF or WP may be recorded on your transcripts (depending on your standing).

# Accessibility

*Northern Illinois University is committed to providing an accessible educational environment in collaboration with the Disability Resource Center (DRC). Any student requiring an academic accommodation due to a disability should let his or her faculty member know as soon as possible. Students who need academic accommodations based on the impact of a disability will be encouraged to contact the DRC if they have not done so already. The DRC is located on the 4th floor of the Health Services Building, and can be reached at 815-753-1303 (V) or [drc@niu.edu](mailto:drc@niu.edu).*

***I look forward to talking with you to learn how I may be helpful in enhancing your academic success in this course.***

# Academic Integrity

**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.*