Syllabus for Physics 253, Fundamentals of Physics I: Mechanics
Fall Semester, 2011
Section 2: MWF 9:00 – 9:50, FR 144
TLC: MWF 12:00 – 12:50, DH 116
Instructor: Dr. Suzanne Willis
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815-753-6481
Office Hours: Daily 1:00 pm – 3:00 pm, and by appointment

Course Textbook: Physics for Scientists & Engineers with Modern Physics (4th edition)
Author: Giancoli
You can buy either the two-volume edition (Volume 1 for PHYS 253 and Volume 2 for PHYS 273) – this will cost more in total but the books don’t weigh as much – or the one-volume edition which covers both PHYS 253 and PHYS 273 and is very heavy. Used textbooks are fine.

Homework: Homework will be done online through Sapling Learning, http://www.saplinglearning.com/. It will cost you $30 for the semester, but is not tied to any particular textbook; this means you can buy a used version of the textbook, or even an earlier edition. This is an excellent homework system, with extensive hints and help.

1. Go to http://saplinglearning.com
2. a. If you already have a Sapling Learning account, log in, click "View Available Courses", then skip to step 3.
   b. If you have Facebook account, you can use it to quickly create a Sapling Learning account. Click "create account" located under the username box, then click "Login with Facebook". The form will auto-fill with information from your Facebook account (you may need to log into Facebook in the popup window first). Choose a password and time zone, accept the site policy agreement, and click "Create my new account". You can then skip to step 3.
   c. Otherwise, click "create account" located under the username box. Supply the requested information and click "Create my new account". Check your email (and spam filter) for a message from Sapling Learning and click on the link provided in that email.
3. Find your course in the list (listed by school, course, and instructor) and click the link.
4. Select your payment options and follow the remaining instructions.
5. Once you have registered and enrolled, you can log in at any time to complete or review your homework assignments.
6. During sign up - and throughout the term - if you have any technical problems or grading issues, send an email to support@saplinglearning.com explaining the issue. The Sapling support team is almost always more able (and faster) to resolve issues than your instructor.
Themed Learning Community: This course and MATH 229 form a themed learning community, Calculus and Physics for Engineers. Dr. Grubb and I have reorganized both of our courses to ensure that you learn the mathematical tools of calculus before you need to use them in physics. In addition, we have designed some assignments that are common to both classes, applying concepts you have just learned in calculus to concepts you have just learned in physics. We will also have you apply these concepts to problems of interest to engineering, and will have activities outside of class that will introduce you to real-life engineering problems.

Coverage (see http://www.niu.edu/willis/phys_253_labs.shtml for the lab schedule):

Week 1, 8/22 – 8/26: Chapter 1; Chapter 2.1-2.2. Significant figures; uncertainty; measurement; units; estimating; dimensional analysis; reference frames; displacement; velocity.
Week 2, 8/29 – 9/2: Rest of Chapter 2. Instantaneous velocity; acceleration; 1-d kinematics; free fall.
Week 3, 9/7 – 9/9: Chapter 3.1 – 3.6; Chapter 7.2; Chapter 11.2. Vectors; components; addition of vectors; dot and cross products; unit vectors; 2-d kinematics.
Week 4, 9/12 – 9/16: Rest of Chapter 3. Projectile motion; relative velocity. Exam 1.

Exam 1, Chapters 1-3 (including 7.2 and 11.2): Friday, Sept. 16

Week 5, 9/19 – 9/23: Chapter 4. Force; Newton's 1st law; mass; Newton's 2nd law; weight; normal force; Newton's 3rd law; freebody diagrams.
Week 6, 9/26 – 9/30: Chapter 5; Chapter 6.1 – 6.3. Friction; circular motion; centripetal acceleration and force; gravity.
Week 7, 10/3 – 10/7: Rest of Chapter 6; Exam 2; Chapter 10.1 – 10.3. Weight; angular quantities; angular kinematics.

Exam 2, Chapters 4-6: Wednesday, Oct. 5

Week 8, 10/10 – 10/14: Chapter 10.4; Chapter 11.2; Chapter 10.5 – 10.7; Chapter 7.1 – 7.2. Torque; cross product; rotational inertia; rotational dynamics; work; dot product.
Week 9, 10/17 – 10/21: Chapter 7.3 – 7.4; Chapter 8.1 – 8.4. Work by variable forces; kinetic energy; conservative and nonconservative forces; potential energy; conservation of mechanical energy.
Week 10, 10/24 – 10/28. Rest of Chapter 8. Conservation of energy in the presence of nonconservative forces; gravitational potential; escape velocity; power; equilibrium.
Week 11, 10/31 – 11/4: Exam 3; Chapter 9.1 – 9.3. Momentum and its conservation; collisions; impulse.

Exam 3, Chapter 10.1 – 10.7, Chapters 7 and 8: Monday, Oct. 31

Week 12, 11/7 – 11/11: Rest of Chapter 9; Chapter 10.8. Elastic and inelastic collisions; 2-d collisions; center of mass; rotational kinetic energy.
Week 13, 11/14 – 11/18: Rest of Chapter 10; Chapter 11. Rolling; angular momentum and its conservation; tops, gyroscopes, and the Coriolis force.
damped harmonic motion; forced oscillations; resonance.

**Final Exam, Chapters 9, 10.8 – 10.10, 11, 14 and comprehensive** (according to the exam schedule, [http://www.reg.niu.edu/regrec/dates/fall/standardexams.shtml](http://www.reg.niu.edu/regrec/dates/fall/standardexams.shtml); exams take place in the regular classroom):

**Section 2: Wed. December 7, 8-9:50 am, FR 144**
**TLC: Monday, Dec. 5, 12:00 – 1:50 pm, DH 116**

Homework assignments and their due dates can be found on the Sapling Learning site, [http://www.saplinglearning.com/](http://www.saplinglearning.com/). Please note that late homework will not be accepted.

There will be interactive exercises during class, and these will count towards your grade.

You will be encouraged to form small study groups. You may work on your homework with your study group, although you should each submit your own solutions. You may also do the in-class work with your study group, so be sure to sit together.

All exams are closed book, and closed notes. Calculators will be allowed for exams; you should have a scientific calculator that is not a graphing calculator or part of another device such as a smart phone. If you have questions about your calculator please ask the professor.

**Grading:**

Lecture grade:
- Homework 10%
- In-class exercises 20%
- Exams 1, 2, and 3 15% each
- Final exam 25%

Lecture grade will make up 75% of the final grade

Lab will make up 25% of the final grade. **YOU MUST PASS THE LAB IN ORDER TO PASS THE COURSE.** Your lab TA will have details about grading the lab portion of the course. Details about the labs can be found here: [http://www.niu.edu/willis/phys_253_labs.shtml](http://www.niu.edu/willis/phys_253_labs.shtml)

**There are Physics Tutors available in Faraday Hall Room 251.**

**If You Need Physics Help**

If you need help, here is what you should do:
1. Ask the professor! This is why we have office hours. We are always happy to help you understand physics.
2. Ask your lab TA, particularly about questions involving the lab.
3. Go to the physics help room. It is staffed by physics graduate students.
4. There are tutoring services available at several locations around campus. See [http://www.niu.edu/access/guide/CampusResourceGuide.pdf](http://www.niu.edu/access/guide/CampusResourceGuide.pdf) for a complete list.
Disabilities

If you have specific physical, psychiatric or learning disabilities and require accommodations, please let me know early in the semester so that your learning needs may be appropriately met. You will need to provide documentation of your disability to the Center for Access-Ability Resources (CAAR), located on the 4th floor of the University Health Service, 753-1303.

Academic Misconduct

Academic misconduct is defined in the Student Code of Conduct as receipt or transmission of unauthorized aid on assignments or examinations, plagiarism, unauthorized use of examination materials, or other forms of dishonesty in academic matters. Sanctions vary; the instructor has the right to impose sanctions up to assigning a grade of F for the course.

Make life easier on all of us – don’t cheat! If you do, I will not overlook it. If you need help with anything, please ask.