

Physics 211 H **Spring Term 2013**

LEC: 11:00 am – 12:15 pm, Tuesdays and Thursdays, Jorgensen Hall 145
REC: 11:30 am – 12:20 pm Wednesdays, Jorgensen Hall 145

Instructor: Axel Enders, 083 Jorgensen Hall, Office phone: 472-7055
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Course Web Site: UNL BlackBoard Learning System

Office Hours: Wednesday, 2 pm – 3:30 pm.

Pre-requisites: Math 106 (can also be taken in parallel), Math 107 or parallel preferred.
One-year of high school physics or PHYS 141 or 151.

Course material:

- Required: The online material in SmartPhysics will be the main resource for the class. See the handout on Blackboard for instructions on how to register for SmartPhysics. The following components are included in SmartPhysics:
 - Online Prelectures (animated textbook, due before each lecture)
 - Online Preflights (simple quiz to test prelecture understanding, due before each lecture)
 - Online Homework (due once a week).
- electronic calculator
- PRS “clicker”, newest version
- Optional: SmartPhysics, W. H. Freeman, 2012. Additional reference textbooks will be available in the Physics Help room.
- Optional: textbook: University Physics, 13th Edition, Volume 1, Authors: Young and Friedman

To-Do list for the first week of classes, starting Jan-7-2013:

- Purchase the online access for SmartPhysics, see instructions on separate document
- Purchase a PRS clicker
- Register the PRS clicker under your name, either at the bookstore or via your my.unl.edu web site. (for detailed instructions: <http://itg.unl.edu/workshops/prs.shtml>)

Course goals (*in compliance with the ACE program*):

Student Learning Objective 4: Use scientific methods and knowledge of the natural and physical world to address problems through inquiry, interpretation, analysis, and the making of inferences from data, to determine whether conclusions or solutions are reasonable.

This course provides first- and second-year students with an introduction into university physics, with focus on mechanics. The objective of this course is to familiarize you with basic concepts that form the foundation of modern physics, to develop logical and analytical thinking and problem solving skills. The core skill of the course is the mathematical analysis of physical problems in order to connect their understanding of the relevant physical principles and laws

pertaining to a physical system to the analytical and quantitative implications and logical outcomes. This is achieved through detailed analysis of a mathematical representation of the system or problem, drawing inferences from the problem's statement and context, structured by formal reasoning, and executed by analytical, computational means. The solutions' validity and reasonableness are evaluated by considering acceptable physical limits and performing simple checks testing, for example, the conservation of energy through additional computational calculations and estimates.

Student abilities for appraising physical situations are assessed in several ways. The course grade is based on a cumulative score that is derived from the following components, which are all graded and weighted according to the breakdown given in this syllabus. For each lecture assessment activities include student responses to (i) pre-lecture quizzes, (ii) Peer Instruction (PRS) questions posed during the lectures, and (iii) follow-up homework exercises and problems. For the weekly recitations students are assessed based on their performance in (iv) team problem-solving exercises, and (v) occasional quizzes. Progress in the course as a whole is assessed with (vi) two 1.5-hour midterm exams and (vii) a 2-hour comprehensive final exam.

Physics may not be relevant for the job you take on in the future, but you will certainly leave this course with improved analytic thinking and problem-solving skills. *I expect that you are self-motivated, have an interest in this subject, work with increasing level of independence, are proactive and seek my help if they struggle or if you need extra challenges.*

i>Clickers:

We will use Clickers in class as a way to make the lectures more interactive. The clickers can be purchased at the bookstore. The clickers need to be registered online: the registration link is available on Blackboard on the page of this course. Students are asked not to trade clickers or bring clickers of their friends who are missing lectures.

Before you come to class:

Before each lecture you will have to complete the assigned prelectures and preflights on the SmartPhysics website. You will also have to solve a simple *online preclass problem* on the same website. Students will receive credit for this assignment, which count toward your final grade.

Lectures:

The lecture periods will include discussion of the assigned readings in the text, a variety of demonstrations, which illustrate some of the principles you will be learning, in class participation and examples of problem solutions.

There will be mini-quizzes during the lectures. They will be multiple-choice questions, based upon all presented materials. You will need a "*clicker*" to respond to the questions via the Personal Response System (PRS). Your PRS participation will contribute to your final score, see 'Course Grading' below.

Homework:

Weekly homework assignments will be done online using SmartPhysics. Unless otherwise specified, homework assignments will be posted on Thursday of each week and will be due by midnight Wednesday of the next week. Follow the course web site for any changes to the homework schedule.

Recitations:

Recitations are Wednesdays of each week. This is your primary opportunity to learn problem-solving techniques. In the recitations, you will have the opportunity to ask questions about the homework assignment due that week. There will also be a small number of quizzes given in recitation as well as problems you will solve working in a small group.

Exams:

There will be two 1-hour midterm exams and a two-hour **comprehensive** final exam. You will need an electronic calculator during the exams, and calculators cannot be shared. Crib sheets will be provided. There are no make-up or alternate exams outside the dates listed below. More details about the exams will be provided during the semester.

Exam dates (preliminary):

1 st midterm exam	February 12, during class hours
2 nd midterm exam	March 26, during class hours
final exam	May 2, 3:30pm – 5:30pm

Relevant dates:

No class:	Jan 17
UNL spring break:	March 17 – 24 (Sun-Sun)
Last class:	April 25

Course Grading:

Course grades will be determined according to the following weighting:

25%	Final Exam
20%	First Midterm Exam
20%	Second Midterm Exam
20%	Homework
10%	Online preclass problems
5%	Participation in PRS response questions during lecture

Your letter grade will be assigned based upon the following numerical scale:

		percentage points			percentage points
A+	(4.0)	96.2 – 100	C+	(2.33)	71.0 – 75.1
A	(4.0)	92.0 – 96.1	C	(2.0)	66.8 – 70.9
A-	(3.67)	87.8 – 91.9	C-	(1.67)	62.6 – 66.7
B+	(3.33)	83.6 – 87.7	D+	(1.33)	58.4 – 62.5
B	(3.0)	79.4 – 83.5	D	(1.0)	54.2 – 58.3
B-	(2.67)	75.2 – 79.3	D-	(0)	50.0 – 54.1
F: less than 50%					

The following table lists the lecture dates, tentative lecture topics, and corresponding textbook chapters for the course. **All dates are preliminary.**

#	Lecture Date	Lecture Topic
1	Jan. 8	Introduction 1-D Motion
2	Jan. 10	1-D Motion, Free Fall
3	Jan. 15	Projectile Motion
4	Jan. 22	Circular Motion, Relative Vel.
5	Jan. 24	Newton's Laws
6	Jan. 29	Apply Newton's Laws
7	Jan. 31	Friction, Circular Dynamics
8	Feb. 5	Work, Kinetic Energy
9	Feb. 7	Review for Exam I
	Feb. 12	Exam I
10	Feb. 14	Conservation of Energy
11	Feb. 19	Conservation of Energy
12	Feb. 21	Center of Mass
13	Feb. 26	Conservation of Momentum
14	Feb. 28	Conservation of Momentum
15	Mar. 5	Rotational Kinematics
16	Mar. 7	Moment of Inertia, Torque
17	Mar. 12	Cons. of Angular Momentum
18	Mar. 14	Cons. of Angular Momentum
	Mar. 26	Exam II
20	Mar. 28	Equilibrium, Sections 1-3 only
21	Apr. 2	Gravitation
22	Apr. 4	Gravitation
23	Apr. 9	Periodic Motion
24	Apr. 11	Physical Pendulum, Damping
25	Apr. 16	Mechanical Waves
26	Apr. 18	Mechanical Waves
27	Apr. 23	Review of topics since Exam II
28	Apr. 25	Review + Summer special
	May 2	Final Exam

Extra help

It is strongly recommended that you do as much of the homework as possible by yourself. However, sometimes you will run into a “brick wall” that prevents you from making further progress on a specific problem. In such cases you should seek help. You can then ask one of your fellow students, and try to work such problems in study groups. Other resources are Prof. Enders during his office hours and the Physics Help Classroom. This classroom is staffed by TAs. The classroom location and hours will be posted during the second week of classes.

Students with disabilities are encouraged to contact the instructor for a confidential discussion of their individual needs for academic accommodation. It is the policy of the University of Nebraska-Lincoln to provide flexible and individualized accommodation to students with documented disabilities that may affect their ability to fully participate in course activities or to meet course requirements. To receive accommodation services, students must be registered with the Services for Students with Disabilities (SSD) office, 132 Canfield Administration, 472-3787 voice or TTY.