

Syllabus
Physics 211
Mechanics, Gravitation, and Waves
Fall Semester 2017

Instructor: Ilya Kravchenko
Office: Jorgensen Hall, Room 258C
Phone: 472-6014
Email: ikrav@unl.edu
Office Hours: Wednesday 14:00-17:00

Prerequisites: High-school physics or PHY 141 or 151; Math 106 or parallel;
(Math 107 or parallel preferred)

Lecture for section 150:
Tuesday, Thursday 9:30-10:45, Jorgensen 136

Lecture for section 250:
Tuesday, Thursday 11:00-12:15, Jorgensen 136

Course Objectives:

Physics 211 is the first semester of the calculus-based introductory physics sequence, aimed mostly at science and engineering majors. This course focuses on the topics of mechanics including kinematics, dynamics, gravitation, the mechanical properties of waves. We will emphasize developing both conceptual understanding and problem-solving skills for these topics and understanding how they fit into the broader picture of science. Calculus will be used extensively in this course.

Textbook

University Physics, 14th Edition (Vol. 1), Young and Freedman (Pearson 2016). Note that one can use instead an e-text that can be obtained with the online homework system (see below), or use older editions, 13 or 12, that can be purchased at a lower price. For older editions, one should be aware that chapter and problem numbering is a bit different. The physics is the same, however.

WWW – Canvas and Modified Mastering Physics

Canvas. Much class information including the syllabus, sample exam questions, *etc.* will be posted on the UNL Canvas pages of this course. You are expected to read the relevant sections in the textbook **before** coming to class. See the course schedule in a separate document “Reading and lecture schedule” posted on Canvas under “Modules”.

Modified Mastering Physics® (MMP). The weekly homework problems as well as the pre-lecture assignments (see below) will be accessed online at the MMP web site, and graded by MMP. Details of gaining MMP access can be found on Canvas under “Modules” in the area “Modified Mastering Physics student registration”. You must purchase this access from Pearson in addition to the physical textbook (note: if the UNL Bookstore runs out of access cards for MMP it is faster to just register and pay online than to wait for the bookstore to backorder the cards). As alternative to the physical textbook, you can get access to the e-text of the textbook via the MMP web site. Please note that Pearson has presently

“MasteringPhysics” and “Modified MasteringPhysics”. We need the “Modified” one. The provided access instructions let you connect to exactly that. The Canvas page of this course has the “MyLab and Mastering” link on the left that gives you the direct link to that system.

Pre-lecture assignments

Beginning on Thursday, August 24, and for every lecture from then on, you will be assigned a brief on-line assignment on the material that will be covered on the next lecture (see the Class Schedule document for which chapter to read for which date). You will be taking these assignments on the MMP, you can access them through the Canvas home page of this course, in the “MyLab and Mastering” tab following the “Mastering Assignments” link. The quizzes will open soon after the end of each lecture, and will be due at 8:30am on the day of the next lecture. The credit for the quizzes will count toward the final grade.

The assignment may contain simple concept questions or mini-problems for credit, video prelectures for extra credit, and the feedback question for extra credit.

Homework

There will be a homework assignment due roughly each week consisting of six to ten Mastering Physics problems. The homework assignments are accessed just like the pre-lecture assignments explained in the previous section. Each homework will cover a single chapter of the textbook discussed on most recent lectures. Normally, the homeworks will be due on Mondays. The due time will always be midnight. Modified Mastering Physics will clearly display the due date and time, but please pay attention because these may change. Late homework submissions in MMP have a penalty of 20% credit lost per day past due. Students who are not able to complete the homework by the due date should talk to Professor Kravchenko in advance and a due date can be modified under certain circumstances (medical emergencies, illnesses, UNL athletic team events, etc).

You are strongly advised to carefully go through the Introduction to Mastering Physics available on the MP website as an assignment for this course. It is well worth the time, and it is also worth extra credit with the weight of one full homework in the course!

i>Clickers

We will use clickers (iClicker2) in class as a way to make the lectures more interactive. The clickers can be purchased at the bookstore. The clickers have to be registered online: the registration link is available on Canvas on home page of this course under “i>clicker registration” tab. Students are asked not to trade clickers or bring clickers of their friends who are missing lectures.

Lectures and Recitation

The course will have two weekly lectures each lasting 75 minutes. The “lecture” will consist of a mix of presentations and demonstrations led by the instructor along with active discussion and problem-solving by the students. Attendance at lectures and reading the text **before** class is essential for success in the course. The i>clicker2 gadgets will be used both for instructor assessment of where the class is in terms of its understanding, but also to collect answers to “mini-quizzes” which will be graded for credit.

Each student must also enroll in one of the recitation sections for this course. The recitation sections will focus on problem-solving and applying the course material in a variety of new situations. Attendance in recitation is important as well. Recitation grades will be based on team-based problem solving and pop quizzes.

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. Do not spend more than one-half hour (per problem) bashing your head against this wall. After half an hour get help. The best help resources are Prof. Kravchenko (during his office hours) or the Physics Help Classroom. The Physics Help is run by TAs and available every day for most of the regular working hours. The Classroom location and hours will be posted during the second week of classes.

Examinations

There will be three 75-min midterm tests and a two-hour final exam scheduled as follows:

Midterm Test I	Tue Sep 19, during regular lecture slot
Midterm Test II	Thu Oct 12, during regular lecture slot
Midterm Test III	Tue Nov 14, during regular lecture slot
Final Exam	Tue Dec 12, 6pm-8pm

Before each exam, sample exam questions will be provided through Blackboard.

There will be one comprehensive make-up examination given at the end of the semester during the dead week. To be eligible to take this test, you must receive permission from Professor Kravchenko before the test you miss. The make-up test may not be used to replace a midterm test grade.

Grading

The following weightings will be used in determining your grades:

Prelecture assignments on MP	7.5 %
Lecture participation (clickers)	5 %
Recitation (Team problems and Quizzes)	15 %
Homeworks on MP	17.5 %
Three midterm exams (10% each)	30 %
Final exam	25 %

In calculation of the final grade, the two worst homeworks, the two worst pre-lecture quizzes, and the two worst recitations will be dropped. Also, the four worst clicker sessions for each student will be dropped.

Any request for grade changes **must** be made within **2 weeks** after the graded work is made available. Grading will **not** be done on a “curve.” The grades will be determined from your final score using the table below. The table shows the lower cutoff for a grade. For example, if your score is greater or equal to 80% but less than 83% you will get a B.

95	A ⁺
90	A
87	A ⁻
83	B ⁺

80	B
77	B ⁻
73	C ⁺
70	C
67	C ⁻
63	D ⁺
60	D
50	D ⁻
less than 50	F

For Students with Disabilities

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.

ACE CERTIFICATION

This Course has been certified by the Achievement Centered Learning program at UNL to satisfy 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.

The main focus of the course is on the appraisal of physical systems through a comprehensive process of problem solving designed to arrive at a thorough understanding of relationships between the systems and their behavior. This process can be separated into four distinct phases. The first phase consists of an inquiry into the system and its essential components, the available data (which are given in the statement of the problem, or in diagrams, graphs, or reference tables, or some combination of these), and the key physical principles and laws governing the system. The second phase is to interpret the physical principles and laws and data in order to develop a plan - what inferences can be drawn from the data, what is the best way to approach the problem, that mathematical relations and methods are required, what intermediate information must be obtained -- and define goals for a solution. This plan is implemented in the third phase through detailed analysis, with careful attention to accurate execution of the mathematical relations representing the underlying physical principles. Critical evaluation of the reasonableness of the solutions and conclusions is the essential fourth and final phase of problem solving. This evaluation includes checking units, recalculating some quantities by a different route, and judging whether the magnitude of the answer is within reasonable physical limits.

Student abilities for appraising physical situations is 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 the 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) three 1-hour midterm exams and (vii) a 2-hour comprehensive final exam. The pre-lecture quizzes, PRS questions, and some of the homework exercises focus on specific knowledge, basic computational skills, and grasp of key concepts. The students' integrative understanding of physical principles and problem-solving is assessed with the more complex homework problems, recitation group problems, recitation quizzes, and the exams.

The purpose of this review is to help faculty improve student learning outcomes. A small sampling of student work will be selected, identifying information removed, and archived for later review. Any students in ACE courses do not wish their work selected should notify their instructor.