

Lecture Syllabus for Elements of Physics, Fall, 2015
Physics 151, Section 150: MWF 12:30 pm – 1:20 pm (JH136)

Instructor: Sy-Hwang Liou

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Office Hours: 085 Jorgensen Hall, MWF 2:30-3:30 pm or by appointment

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RCT- 8:30-9:20 am (JH245), 9:30-10:20am (JH245) 11:00-11:50 am (JH211), and 12:30-1:20pm (JH211), Tuesday,

Grader: Xuan Huang, usshenqing@126.com

Essential Information:

Elements of Physics (4 cr.) is a quantitative science course revealing the workings our physical environment through the study of mechanics, heat, electricity, and other topics as time allows. The objective of the student is to develop the skills necessary to qualitatively and quantitatively analyze the behavior of physical systems--to solve basic physics problems. The course is suitable for students who need one semester of introductory general physics.

Prerequisite: Math 102 or equivalent. (You should be comfortable with triangle trigonometry and algebraic manipulation of variables in an equation.)

Laboratory: Physics 153 recommended but not required.

Required Materials: *College Physics*, form Openstax college (free PDF download, visit <https://www.openstaxcollege.org/textbooks/college-physics> and click “Get This Book”
i>clicker2 (voting clicker), scientific calculator.

Blackboard: class notes, home works, announcements.

Changes:

This syllabus is subject to change. Any changes will be announced via Blackboard and in class.

Course Activities, Assessment and Grades

Class Preparation: A pre-lecture PDF file will be available through a link on Blackboard before each class. Please review it before the class. (Note: In the classroom, we will only discuss a few viewgraphs which are related to critical and important concepts. You will need to review the derivation of the equations yourself.) If there are sections that are not clear in the PDF file, please review this material in the corresponding sections of the textbook.

Lecture Class: Attendance and participation at all lectures is required. **Note:** [there won't be a traditional lecture.](#)

The focus are as follows:

- Review and discussion of important concepts
- Modeling of problem solving techniques
- Demonstrations
- Peer instruction – voting on and discussing the solutions to multiple choice questions.

Class is an activity and should not be wasted by passivity: --listen -- think -- discuss --ask questions -- answer questions -- be courteous. Your grade will include a Class Participation score based on participation in the regular Peer Instruction activities and those in-class worksheets that are collected.

Class Participation: 5% of your grade will be based on participation in the i>clicker 2 exercises conducted during class and those worksheets that are collected and graded.

Peer Instruction: During lecture, you will answer conceptual questions using a radio frequency remote device. A computer in the lecture hall will record all responses and display the results. You may then discuss the question with 2-3 of your peers and revise your answer if there is a second vote. Often, the majority of the class gives the wrong answer the first time, but after discussion, comprehension improves significantly. The Peer Instruction/ConceptTest method also helps the instructors learn what difficulties students are having and address them on the spot, instead of waiting until after an exam.

Worksheets: Worksheets focusing on problem solving will be done in class each day. You should work in groups and discuss the concepts with your neighbors. Your instructor and teaching assistants will provide help when needed. A worksheet key will be available on Blackboard after the next class.

Homework: 10% of your grade will be based on homework. Problems will be given in Blackboard each week and are due at Friday before the class. You also should write down all of your work step by step for each problem to use as a problem solving guide when preparing for exams.

Recitation: 15% of your grade will be based on worksheets or other activities completed at weekly recitations. The recitation will be in a group format. The class will be divided into groups of 3 students who will work cooperatively on solving a challenging physics problem, one that includes some of the conceptual difficulties in that chapter. This is an important opportunity to learn problem-solving techniques. Active participation is required in recitation. One recitation grade or absence will be dropped. Absence from recitation can lower your grade by one grade point or more. RCT-Worksheets done in groups where the instructor and teaching assistants will answer questions.

Exams: (70%)

There will be two mid-term exams and one final exam. Students who need special arrangements should consult the instructor asap. The midterm exam locations, dates and times are during regular class time unless otherwise announced in class. The final exam is a unit exam, Thursday Dec 17 from 3:30-5:30 PM. The exam rooms will be announced in class. All exams will be closed book and notes. A calculator is allowed and blank paper will be provided. Crib sheets will not be allowed- a sheet of formulae will be attached to each exam if necessary. You should neatly write out your solutions on paper to be graded for partial credit. Cell phones and other electronic devices will be turned off.

Exam Schedule (subject to change)

Midterm Exam 1 (20%) JH 136, 12:30-13:20 PM, Friday, **Sept. 25, 2015**

Midterm Exam 2 (20%) JH 136, 12:30-13:20 PM, Friday, **Nov. 2, 2015**

Final Hour Exam (30%) 3:30-5:30 PM, Thursday, **December 17, 2015**

Location: To be announced

(September 7 Labor day, October 19-20 Fall Semester Break, November 25-27 Thanksgiving)

Make-ups:

There are **no** make-ups for worksheets or missed lectures or recitations. If you miss an exam with a documented absence conforming to excused absence by the current standards of the College of Arts and Sciences at UNL, you may request an incomplete and will be able to repeat the entire course for a grade, or in exceptional cases a make-up exam can be scheduled by your instructor.

Determining Class Grade

Component	Percentage
First Exam	20
Second Exam	20
Final Exam	30
Recitation	15
Class Participation and worksheets at class	5
Homework and Practice Assignments	10
Total	100

Range	Grade
$95\% \leq x < 100\%$	A+
$90\% \leq x < 95\%$	A
$85\% \leq x < 90\%$	A-
$75\% \leq x < 85\%$	B-, B, B+
$65\% \leq x < 75\%$	C-, C, C+
$55\% \leq x < 65\%$	D-, D, D+
$x < 55\%$	F

Grades are final and cannot be negotiated unless an error has occurred. Incompletes will only be given for verifiable, extenuating circumstances, such as a long-term hospitalization. Scores will be made available and you are strongly encouraged to scrutinize your scores. **Although great care is taken in the recording of grades, errors do occur and it is your responsibility to make sure the recorded scores are correct!** No effort will be made to attach letter grades to scores until the end of the term. Using the estimated grading scale and the percentage contributions of the various course components given above, students can do just as well a job of estimating their present grade in the course as their instructor can.

Academic Dishonesty

Academic dishonesty will be handled according to the university guidelines for undergraduate studies. For a summary of these guidelines the following copy is included: At UNL before an instructor acts on suspected cheating, the student must be provided the opportunity to discuss the situation. Either the student or the instructor may then bring it to the attention of the instructor's department chair or head, the student's adviser, the college dean or the Vice Chancellor for Student Affairs. For admitted or proven dishonesty the instructor may go so far as to **fail the student for the assignment or for the entire course**. If the penalty suffices to cause the student to fail the course the instructor must write to the department chair or head and to the Vice Chancellor for Student Affairs, informing them of the facts and of the penalty. The student must be given a copy of this report. The instructor may recommend further punishment, and the Vice Chancellor may submit the case to the University judicial system. For a full report of the possible consequences, see Student Code of Conduct (indexed in the "UNL Undergraduate Bulletin, <http://stuafs.unl.edu/dos/code>).

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 Building, 472-3787 voice or TTY.

ACE CERTIFICATION

(i) the ACE Outcome(s) for which the course is certified:

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.

(ii) the opportunities the course will give students to acquire the knowledge or skills necessary to achieve the Learning Outcome(s):

The students will have the opportunity to learn how to analyze physical systems through a combination of exposition, directed inquiry, and problem solving. The main focus of the course is on the appraisal of physical systems arrived at a thorough understanding of the relationship between the system and its behavior. This process can be separated into four distinct phases. The first phase consists of an inquiry into what is the system and its essential components, what are 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 what are 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, what 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.

(iii) the graded assignments which the instructor will use to assess the student' achievement of the Outcome(s):

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 homework exercises and problems and occasional quizzes if necessary. For the weekly recitations students are assessed based on their performance in team problem-solving exercises. Progress in the course as a whole is assessed with midterm exams and a comprehensive final exam. Some of the homework exercises and quizzes 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, and the exams.

(iv) sampling of outcomes for purposes of curriculum review

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.