Physics 212 (Section 350)
General Physics II
Spring 2017

Course Objectives

1) Learn concepts of electricity, magnetism and optics at an introductory level
2) Develop skills for analyzing and solving quantitative physical problems

Meeting Time

Lecture: 11:30 AM-12:20 PM MWF, 136 Jorgensen Hall
Recitation: 1:30-2:20 PM W or F, 247 Jorgensen Hall

Instructor

Ken Bloom, 258E Jorgensen, 472-6093, kenbloom@unl.edu
Office Hours: Mondays 1:30-4:30 PM or by appointment (or by chance)

Prerequisites

Physics 211, concurrent registration in Math 107

Text

We will follow Young and Freedman, *University Physics, Volume II*, 14th Edition, in class, but you welcome to make use any textbook that you choose.

Online System

Mastering Physics, http://www.masteringphysics.com, for homework and quizzes; course ID **PHYS212Sec350Spr17**. You can purchase access to the system along with the textbook, or standalone. Register for access right away in any case.

Lectures

Lecture periods will include discussions of the material of the day, a variety of demonstrations to illustrate the principles we are studying, and active problem solving. You are expected to do reading on each topic *before* coming to class. During the lecture, you will need a "clicker" to respond to concept questions via the i>clicker system.

Homework

Approximately 8-12 homework problems will be assigned each week via the Mastering Physics system. Mastering Physics grades the problems right away, and gives hints for problem solving. Homework assignments will be due on Wednesdays at 5 PM.

Quizzes

There will be an online quiz before *every* lecture, which will introduce material that will be discussed in that session. They must be completed by 11 AM on the day of the class, and will be available 48 hours before that. You will be able to try each problem four times, and be given credit for your best attempt.

Exams

There will be three 50-minute midterm exams and a two-hour comprehensive final exam. The midterm exams will be given during the lecture period, and the final exam will be on Monday, May 1 at 6 PM. Makeup exams will only be provided in extraordinary circumstances. The (tentative) exam dates are listed in the table below. More details about the exams will be provided as they approach.

Recitations

The recitation will be in a group format. The class will be divided into groups of three students who will work together on a challenging physics problem that includes many of conceptual difficulties. This is an excellent opportunity to sharpen your problem-solving skills. There are no make-ups for missed sessions.

Grading (approximate)

25% -- final exam
40% -- midterm exams
15% -- homework
10% -- recitation problems
5% -- pre-class quizzes
5% -- participation in response questions during lecture

Grade Scales

There will be guaranteed minimum scores for letter grades. A score of 93% will result in at least an A, 90% at least an A-, 87% at least a B+, etc.

Grading Options

Option 1: If your final exam score is higher than your cumulative course score, your final exam score alone will be used to determine the final grade. You must take all midterm exams to qualify for this option.

Option 2: If your total score before the final exam is either 90% or 93% of the score already awarded, then you will not have to take the final exam and will receive a final grade of at least A- or A.

How to Succeed

One of the keys to success in this course (besides of course learning the physics!) is keeping up with the pace of the class. Every week, you will need to do some reading and complete assignments, both homework and quizzes. Be prepared to devote 12 hours of your time outside of class to this work to learn the material. But you probably don't want to put those 12 hours into a single block of time once per week! Do some work each day. Don't forget to do the quizzes before each lecture. After each lecture, look at the homework assignment and see what problems you might be able to complete. If you can complete them, do so; if not, consider going to your instructor's or TA's office hours for assistance, or make use of the Physics Resource Room (JH 253, open all day M-F) or be prepared to ask questions in the recitation period. If you do this, you can probably confine your homework to weekdays and then just take time over the weekend to read the chapter(s) of the book that will be discussed in the coming week. Find a weekly routine that works for you.

Academic Integrity

Refer to the Student Code of Conduct and Academic Integrity, which can be found at the Student Judicial Affairs Web site and in the back of the Undergraduate Bulletin. The first violation of the code will result in at least a failing grade for the assignment and notification of university officials. Further action may be taken. Subsequent violations will result in failure for the course, along with notification of university officials. To avoid situations of cheating, plagiarism or academic dishonesty, start your work early and contact the instructor in advance if something is unclear.

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.

Physics 212
Course Schedule

Week of	Lecture Topic	Textbook Chapter
January 9	Coulomb's Law/Electric Fields	Chapter 21
January 16	Electric Fields/Gauss's Law	Chapter 21-22
January 23	Gauss's Law/Electric Potential	Chapter 22-23
January 30	Electric Potential/Capacitors	Chapter 23-24
February 6	Capacitors; Current, Resistance	Chapter 24-25
	Friday, February 10 (tentative)	**Exam I (Chapters 21-24)**
February 13	DC Circuits	Chapter 25-26
February 20	DC Circuits, Magnetic Fields	Chapter 26-27
February 27	Magnetic Field Sources	Chapter 28
March 6	Faraday's Law	Chapter 29
	Wednesday, March 8 (tentative)	**Exam II (Chapters 25-28)**
March 13	Inductance, RL Circuits	Chapter 30
March 20	**Spring Break**	
March 27	RLC Circuits/AC Circuits	Chapter 30-31
April 3	AC Circuits/EM Waves	Chapter 31-32
April 10	Reflection, Refraction, Optics	Chapter 33-34
April 17	Geometric Optics	Chapter 34
	Friday, April 21	**Exam III (Chapters 29-34)**
April 24	TBD/Review	
May 1	**Monday, May 1**	**Final Exam**

ACE Certification for Physics 212

(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 gave 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 arrive at a thorough understanding of 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, 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.

(iii) the graded assignments which the instructor(s) 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 (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) midterm exams and (vii) a 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.