

PHYSICS 152

UNIVERSITY OF NEW MEXICO

SPRING 2015

Instructor: Dr. Mark Morgan-Tracy
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Course Number: PHYC 152
Section Number: 001

Meeting Place: Regener Hall 103
Meeting Time: MWF 9:00-9:50 AM

Office Hours in 109 Regener Hall:
Wednesday, 1:30-5:00
Thursday, 1:00-5:00

Office Hours in 114 Regener Hall:
Friday, 1:15-3:30

Home Page: panda.unm.edu/Courses/morgan-tracy/152/Phys152Spring15.htm

Mastering Physics: www.masteringphysics.com

Mastering Physics Access Code: **PHYC152SPRING2015**

I-clicker Registration: www.iclicker.com/registration

Course Description

Welcome to Physics II, the second semester of algebra-based introductory physics. This semester we will be covering electricity, magnetism, optics, and modern physics. These topics are the supreme accomplishments of nineteenth and twentieth-century physics and their applications to the technology that we use every day are almost limitless. I hope that you come to appreciate them the way I do.

I hope that you do well in this course. You will need to work hard to succeed. I can only do so much to cram the concepts that we will cover into your brain, the rest is up to you. If you are willing to really think about what you are reading, to do the homework, and most importantly to let me know when you're still not getting something, then I'm sure we can have a very successful class for everyone.

Prerequisite: PHYC 151 (Physics I).

Text

The textbook used for this class is the third edition of **College Physics: A Strategic Approach** by Knight, Jones, and Field, Pearson Addison-Wesley, 2015. The second edition

of the textbook will be fine for reading assignments, but you *must* get or already have a third-edition Mastering Physics access code.

Learning Outcomes

The overall objective is that the students can describe physical phenomena using a variety of models and develop certain analytical skills associated with problem solving. By the end of the course, the student should be able to:

- calculate the electric force or electric field for point charges using Coulomb's Law and superposition.
- calculate the electric potential for point charges and simple charge distributions.
- analyze circuits containing combinations of resistors and capacitors using Ohm's and Kirchoff's laws.
- use the right-hand-rule for predicting the direction of the force on a moving charged particle in a magnetic field.
- calculate the magnitude and direction of the magnetic field created by current-carrying wires, current loops, and solenoids.
- apply Faraday's law to predict the induced emf and induced current values in induction problems.
- use Lenz's law to predict the direction of the induced current in a solenoid.
- explain how mutual induction leads to the existence of light.
- predict the intensity of light that has passed through a linear polarizer using the Law of Malus.
- calculate the positions of the constructive and destructive regions in a thin-film, double-slit, and diffraction-grating experiment.
- apply the thin-lens and mirror equations to solve geometric-optics problems.
- use Snell's law to predict the behavior of light upon changing media.
- recognize and draw ray diagrams for simple mirror and lens systems.
- explain the difference between alpha, beta, and gamma radiation.

Office Hours

I will be available to provide additional tutoring and to help students with their homework in room 109 of Regener Hall on Wednesdays 1:30-5:00 and on Thursdays 1:00-5:00. (Please note that if there are many students seeking help we may relocate to a larger nearby room.) On Fridays 1:15-3:30, I will be in room 114 of Regener Hall. I realize that these times will, most likely, be inconvenient to those students who have jobs or other classes, and I encourage you to contact me to set up an appointment for a different time. Email is the best and quickest way of contacting me. I will try my best to accommodate your schedule.

Calculator

While Physics, at this level, is an excellent example of the power and uses of algebra, its numerical calculation requirements are fairly simple. To that end, you do not need a scientific or graphing calculator for this class. The basic requirements is that your calculator must be able to do scientific notation as well as simple trigonometric (sine, cosine, and tangent) functions. If you have a scientific calculator, I encourage you to use it to its full capacity; however, its use on homework and tests must be clearly indicated.

Course Requirements

I-Clickers: I-clickers will be used throughout the lecture to give students the opportunity to actively participate in the lecture and to interact with each other. Throughout each lecture, students will be given a series of conceptual or easy-to-calculate questions. Upon initially seeing the question, students are required to use their clickers to answer the question individually. Students will then discuss their answers with nearby classmates and the question will be given again. Students who get the correct answer on the second try will receive three points while students who still have an incorrect answer will receive two points. Non-attendance will result in zero points. For each lecture, each student's total points divided by that day's maximum will give a score out of 1. At the end of the term, your three lowest days will be dropped in determining your average.

If you do not have an I-clicker from the previous semester, one can purchased at the bookstore. You must register your I-clicker for the new semester by going to www.iclicker.com/registration and following the instructions there. Students should use their NetID (their email address) when registering their clicker. Please note that **you must re-register your I-clicker every term**. Instructions and help on the I-clickers can also be found at panda.unm.edu/Courses/StudentHelp/index.html.

Reading Quizzes: Before every lecture, students will take a short (two or three question) online quiz about the material to be covered in that lecture. These reading quizzes will be administered

on the Mastering Physics website (<http://www.masteringphysics.com/>). They will be posted a day in advance and are due by 11:59 of the evening prior to lecture. (Monday's lectures will have their reading quizzes due Sunday evening.) When determining your average at the end of the term, your three lowest reading quizzes will be dropped. Specific reading assignments will be posted on the class's physics and astronomy webpage (panda.unm.edu/Courses/morgan-tracy/152/Phys152Spring15.htm).

Homework: Homework assignments will be a combination of online questions that will be collected using the Mastering Physics system, as well as, written questions that will be turned in to me. Mastering Physics (<http://www.masteringphysics.com/>) access can be obtained by purchasing a new textbook, through the bookstore, or online. *If you have purchased an access code in the past two years and are using the same textbook, you should be able to login to the Mastering Physics website and enroll in this course.* The course ID for this term is **PHYC152SPRING15**. Unfortunately, if you used a different textbook for Physics I, you will have to purchase a new access code. The Mastering Physics assignments will be due by 11:59pm of the due date (usually Fridays). A late assignment may still be done with an automatic 10% deduction for each day that it is late. Written assignments must show all steps and should be neatly written in pencil. Each problem will be given partial credit based on the level of completion and **organization**. Written assignments are due to me at the end of my Friday office hours at 3:30 PM. Late written homework assignments may be turned in for a 65% participation grade.

I do not drop a homework score! Students are expected to do every problem assigned. It is highly recommended that you do *NOT* give up on Mastering Physics problems. The penalty for doing so is always much higher than attempting the problem multiple times.

There is no penalty for looking at and missing questions in hints on Mastering Physics; however, *there is a penalty for giving up and requesting an answer* in a hint!

Extra Credit: Shortly after each lecture, additional problems will be made available for student on the Mastering Physics website. Students who answer these problems by end of the next day will be given extra credit. (Friday's extra credit problems are due Sunday evening.) At the end of the term, students may earn a maximum 2% increase in their final class average based on the number of problems correctly answered. Extra-credit problems are based on effort. Unlike the homework, they do not take off points for incorrect attempts. Solutions to the extra credit problems will be posted on the class's webpage.

Exams: There will be four in-class exams given throughout the semester. (See schedule for dates.) Exams will consist of some, to be determined, combination of multiple choice

and written questions. Occasionally there may also be a take-home component which will be due on the day of the exam. Your lowest exam score will be dropped in determining your exam average.

Final Exam: An in-class, comprehensive final exam will be given on Wednesday, May 6 from 7:30 to 9:30 AM. In the event of a UNM closure on the date of the final exam, final grades for students will be calculated based upon the work assessed up to that point.

Course Grade: At the end of the semester, the course grade will be calculated based upon the following percentages. In the case that the average of *all four* exam grades exceeds the homework average that higher average will be used for your homework score.

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|------------------|---------------|---------------|------------|-----------------|
| Reading Quiz: 5% | Clickers: 10% | Homework: 25% | Exams: 45% | Final Exam: 15% |
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Letter grades will be assigned according to the following scale:

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|----------------------|---------------------|----------------------|----------------------|---------------------|----------------------|
| A+ : 99-100 | A : 93-98.99 | A- : 90-92.99 | B+ : 87-89.99 | B : 83-86.99 | B- : 80-82.99 |
| C+ : 77-79.99 | C : 73-76.99 | C- : 70-72.99 | D+ : 67-69.99 | D : 63-66.99 | D- : 60-62.99 |

Course Calendar

Here is a listing of the topics covered in this class along with the corresponding text chapter and an estimate of how long I believe it will take to cover them. Students should consult the class webpage for specific information about which sections of each chapter will be covered during class.

| <u>Week</u> | <u>Date</u> | <u>Topic</u> | <u>Week</u> | <u>Date</u> | <u>Topic</u> |
|-------------|-------------|---------------------------------------|-------------|-------------|----------------------------------------------|
| 1 | Jan. 12 | Ch. 20 - Electric Field and Forces | 9 | Mar. 16 | Ch. 24 (continued) |
| 2 | Jan. 19 | Martin Luther King Holiday | 10 | Mar. 23 | Ch. 25 - Electromagnetic Induction |
| | | Ch. 20 (continued) | | | |
| | Jan. 23 | Last day to Enroll or Change Sections | | | |
| 3 | Jan. 26 | Ch. 21 Electric Potential | 11 | Mar. 30 | Ch. 26 - AC Circuits |
| | Jan. 30 | Last day drop with 100% refund | | Apr. 1 | Exam 3 |
| 4 | Feb. 2 | Ch. 21 (continued) | 12 | Apr. 6 | Ch. 17 - Wave Optics |
| | Feb. 6 | Last day to change grading option | | Apr. 10 | Last day to withdraw without Dean's approval |
| 5 | Feb. 9 | Ch. 22 - Current and Resistance | 13 | Apr. 13 | Ch. 18 - Ray Optics |
| | Feb. 11 | Exam 1 | | | Ch. 19 - Optical Instruments |
| 6 | Feb. 16 | Ch. 23 - Circuits | 11 | Apr. 20 | Ch. 28 - Quantum Physics |
| | | | | Apr. 22 | Exam 4 |
| | | | | | Ch. 29 - Atoms and Molecules |
| 7 | Feb. 23 | Ch. 23 (continued) | 15 | Apr. 27 | Ch. 30 - Nuclear Physics |
| | | | | May 1 | Last day to withdraw with approval |
| 8 | Mar. 2 | Ch. 24 - Magnetic Fields and Forces | 16 | May 6 | Final Exam |
| | Mar. 6 | Exam 2 | | | |
| - | Mar. 9 | Spring Break | | | |