PHYSICS 215
Elementary Modern Physics
Monday Wednesday Friday 1:00-1:50, Olin 103

Instructor: Eric Carlson
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Phone: 758-4994
Cell Phone: 336-407-6528
Office Hours: TR 1-2

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Description: Physics 215 is an introduction to two great ideas of 20th century physics: Einstein’s Special Theory of Relativity, and Quantum Mechanics. By the time you have completed the course, you should be convinced that everything you learned before this class is a lie, and the world is a much stranger place than you have imagined. Once we have completed an introduction to these two topics, we will go on to a variety of interesting applications of these topics.

Materials: In addition to the text, a scientific calculator is a necessity, and should be brought to class every day. Also, you will need to purchase access to Webassign, which is used for both reading quizzes and homework. Naturally, you will need a computer.

Attendance: I expect attendance at every class period. If you miss more than two classes without a valid excuse, I reserve the right to penalize your grade. If you have to miss class for any reason, please contact me in advance so that I will know why you are not there. Please arrive on time so that I will not mistakenly mark you as absent. Generally, the only excuse for missing an exam is illness. If you miss an exam, I will need to see a note from the doctor about your illness. If you are not sick enough to go to the doctor, you should be in class to take the exam.

Seating Assignments: On Friday, September 1 I will ask everyone to place their name on a sheet indicating which seat you are in. That will be your assigned seat for the rest of the semester. If you choose to change seats at a later date, for whatever reason, please let me know. I will use seating assignments to accelerate taking attendance.

Class Participation: I encourage you to ask questions about anything you cannot understand in class. If you don’t ask me questions, I will ask you questions. You have been warned. Class participation counts towards your grade.

World-Wide-Web: Materials for this course can be found on our home page at http://users.wfu.edu/ecarlson/modern. In addition, we will be using Webassign for reading quizzes and homework, at https://www.webassign.net/student.html.

Reading assignments/Quizzes: There will be reading assignments before every lecture. You will also have to take a short quiz about the reading assignment. These can be found on the Webassign pages for this course, under assignments. This quiz must be taken by 9:30 AM every class day. These will normally consist of three multiple choice questions on the chapter you have read for class that day. You will generally only have one chance to get these problems correct.
**Homework:** There will be homework assignments nearly every class period, which can also be found on Webassign. With rare exceptions, these will be submitted electronically. You generally have eight chances to get the problems right (sometimes fewer). Your answers will be graded immediately (except for essay questions). If you are having trouble with Webassign, let me know, and I will be glad to help. After the homework has been completed, solutions to all homework will also appear on Webassign.

**Exams:** There will be three tests and a final. These tests will include both qualitative and quantitative questions. The tests are closed book, though calculators are allowed. The tests are currently scheduled for September 20, October 18, and November 10, with the final on Friday, December 15 at 2:00 PM. Should you miss a test for any reason, contact me immediately.

**Laboratory:** Although there is no lab section of this course, the course is designed to be taken in parallel with PHY 265, which is taught by Jack Dostal. Lab starts immediately at the beginning of the semester.

**Grading:** The two tables at right are a not necessarily accurate guess as to what my grading scheme will be. In particular, I reserve the right to grade on a sliding scale.

**Pandemic Plans:** In the event of catastrophic shutdown of the university, we will make every attempt to continue and complete the course remotely. Check the website for further information. If the web is down, call my home number, or if that doesn’t work, try my cell phone, listed on the front of this form.

**Schedule:** The schedule below is only an approximate estimate of when we will be studying different topics

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<td>Lorentz Transformations, effects of relativity, paradoxes</td>
<td>Momentum and energy in special relativity, invariant mass</td>
<td>Quantization of charge, black body rad., Test 1, Photoelectric effect</td>
<td>Atoms, Bohr model, Franck-Hertz exp., de Broglie hypothesis</td>
<td>Waves, particles as waves, uncertainty, wave function and probability</td>
<td>Operators, unbound problems, tunneling, weirdness of quantum mech.</td>
<td>Quantum mechanics in 3D, hydrogen atom, spin</td>
<td>The periodic table, nuclei, Test 3</td>
<td>Nuclear physics</td>
<td>Advanced Topic #1, {Thanksgiving break}</td>
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<td>Advanced Topic #2</td>
<td>Final 2:00 PM</td>
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