Physics 212

Modern Physics

Spring, 2012

Prerequisites:	Students must have taken and passed PHY122.
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Web:	http://www.wesleyancollege.edu/∼cbenesh
Office Hours:	M 9-10 W 11-12 Th 1:30-2:30 F 4-5
Grading:	55% - 5 Exams 25% - Weekly Homework and Quizzes 20% - Laboratory
Text:	*Modern Physics for Scientists and Engineers*, by Zafiratos,Taylor, and Dubson 2nd Edition *University Physics* by Young and Freedman, 12th edition

- **Exams:** Periodic exams will be given during the lab period, per the attached schedule. The exams will consist of questions similar/related to the homework problems.

  There will be five exams given, the last two during the scheduled final exam period. Provided it is not a zero, the lowest of these scores will be dropped and replaced by the average of the others.Periodic exams will be given in class, per the attached schedule. Students who cannot take the exam at the scheduled time will have five points subtracted from their score.

  The exams will consist of questions similar/related to the homework problems. Roughly half of the exam will consist of multiple choice/short answer problems, with the other half composed of "story"problems similar

to those on the homework. Exams are closed book, but each student is allowed a single sheet(8 1/2 by 11) of formulas.

There will be three exams and a final given, with the final consisting of a regular hour exam plus a conceptual test of topics covered during the semester. For each student, the lowest of the 5 test scores will be replaced by the average of the other four. Zeroes may not be dropped.

- **Lecture Attendance:** Regular attendance in class is both expected and recommended. Generally, quizzes are only given when attendance falls below 80%. Therefore, the day you don't show up is more likely to have a quiz.....

- **Quizzes:** I reserve the right to give unannounced in class quizzes which will count towards the homework portion of your grade. No makeup quizzes will be given.

- **Homework:**There will be a homework assignment every week. Homework will be due at the beginning of class on the assignment's due date.

  Written homework assignments must have your name, the due date of the assignment, and a list of the the problems assigned written at the top of the front of the first page. Solutions to the problems must appear in the order they are assigned. If any of this information is missing, a point will be subtracted from your score on that assignment.

  A correct solution to a homework problem will consist of *all* of the following:

  - 1. A picture that summarizes and represents the problem, including relevant physical information. Depending on the nature of the problem, this may include "physics pictures" such as free body diagrams, motion diagrams, or circuit diagrams.
  - 2. A sentence or two describing why you chose to use those equations in this particular problem. (i.e. what were the keywords in the description of the problem that told you those equations were applicable? What physical principles are you trying to apply?)
  - 3. Correct use of the equations describing the physical situation to extract the correct answer.

- **Late Homework and labs:** Homework and Lab Reports that are turned in late will be penalized one point per day they are late, including weekends and holidays.

- **Laboratory:** Attendance in the laboratory is required. If you cannot attend a lab meeting, makeup laboratories will be available at the instructor's discretion. Arrangement for makeup labs should be made immediately(in advance if possible), as lab equipment must be arranged in advance of the proposed makeup date, and may not be available later. *It is extremely unlikely(although not impossible) that I will agree to allow a student to makeup more than one lab during the course of the semester.*

  After each Lab, a report will be turned in for grading. The lowest lab score for each student will be dropped. Please note that the average score on the lab reports is often around 80 per cent. This means that a student's lab score will not improve her overall course grade much, but a low lab score can significantly **LOWER** your grade.

Class Schedule - Physics 212

Jan	10	Coordinate Systems, Reference Frames
	12	NO CLASS - SCUWP NO LAB **READ:** TZD- Chapter 1, FY- Chapter 37
Jan	17	Newtons Laws vs Maxwell's Equations
	19	Time Dilation and Lorentz Transformations Lab 1 - Fictitious Forces **READ:** TZD-Chapter 2, FY-Chapter 37
Jan	24	Doppler Effect, Relativistic Momentum and Energy
	26	Force and Mass Lab 2 - Doppler Effect **READ:** TZD-Chapter 2, FY- Chapter 37
Jan	31	Atoms and Brownian Motion
Feb	2	Thomson & the Electron, Millikan's Experiment Exam #1 **READ:** TZD- Chapter 3 FY - Chapter 38
Feb	7	Black Body Radiation
	9	Photo-Electric Effect and Photons Lab 3 -Speed of Light **READ:** TZD- Chapters 4,15 FY- Chapter 18
Feb	14	Compton Effect
	16	The Bohr Atom Lab 4 - Millikan's Oil Drops **READ:**Chapters 5,FY- Chapter 38
Feb	21	Wave-Particle Duality
	23	Wavefunctions Lab 5 - e/m for an electron **READ:** Chapters 6, Chapter 39

Feb	28	The Uncertainty Principle
Mar	1	Fourier Transforms Exam 2 **Read** TZD-Chapters 6, FY- Chapter 39
Mar	5-9	NO CLASS
Mar	13	The Schroedinger Equation
	15	Harmonic Oscillator Lab 6 - Black-Body Radiation Read TZD - Chapter 7 FY - Chapter 40
Mar	20	Tunnelling
	22	Spherical Polar Coordinates Lab 7 - Franck-Hertz Lab **READ:** Chapter 7
Mar	27	Quantization of Angular Momentum
	29	The Hydrogen Atom Lab 8 - Interference **READ:** Chapter TZD 7&8 FY Chapter 41
Apr	3	The Zeeman Effect
Apr	5	Fine Structure Exam #3 **READ:** TZD Chapters 8 and 9
Apr	10	Multi-Electron Atoms
	12	The Pauli Principle Lab 9 - Spectroscopy **READ:** Chapter 10 FY Chapter 41
Apr	17	Radiation from Atoms
	19	Exam III Lab 10 - The Schroedinger Equation **READ:** Chapters 11

Apr	24	Spontaneous Emission and Lasers
	26	Reading Day NO LAB **READ:** Chapter 11
May	2	Last Day of Final Exam Week