

General Physics III

Spring 2015

PHYS 283

Tuesday, Thursday, 2:00 – 3:15 pm

LaTourette Hall (Faraday West) Room 200

Instructor:

Professor George Coutrakon

Office: Faraday Hall 218

Phone: (815) 753-6481

Office hours: Tuesday 3:30 – 4:30 pm & Thursday 3:30 – 4:30pm.

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Course description:

Classical optics, special relativity, general theory of quantum mechanics with applications to atomic, solid state, nuclear, and elementary particle physics using calculus.

Web site:

There are two websites for this class. General course information is available on Black Board web site <http://www.webcourses.niu.edu>. The class is also using an on-line homework system provided by Pearson education called “MasteringPhysics”. You can access this web page through <http://www.masteringphysics.com/>. In order to use the mastering physics page you need to either purchase an access code (\$66) or use the free access code that came with your textbook. You can also purchase the access code and an electronic copy of the textbook for about \$110. We need to start with Ch. 34 and Ch.35 which is not in Vol. 3 textboo but is available for the \$110 e-text. If you purchased the book for a previous class such as 253 or 273 your code may still be valid. Once you have an access code you need to enroll in this class which is code number MPCOUTRAKON283

Prerequisites:

Math 230 (Calculus II), and Phys 273 (General Physics II, Electricity and Magnetism)

Textbook:

Physics for Scientists and Engineers with Modern Physics, 4th edition, by Giancoli. We will be covering the third volume (Chapters 36 – 44) as well as two chapters from volume 2 (Chapters 34 and 35). If you do not already have volume 2 from PHYS 273, you can save money by just printing chapters 34 and 35 from the e-text available on the MasteringPhysics page.

Homework (HW):

There will be weekly homework assignments assigned through “Mastering Physics”. Occasionally, HW assignments will be given out in class. Homework will generally not be accepted late without a very good reason. Occasionally, the student may have given

the correct answer which MP did not recognize. These are reviewable by me. Do not panic. Print your answers out and submit to me by hand. Students are also expected to read the chapter or section from the textbook indicated on the syllabus for each week before attempting the problems on that section.

I will transfer grades from MP to Black Board about every 5 weeks and you should check for accuracy when they are transferred.

Grading:

The approximate weighting of grades is given below.

Homework	50%
Exams (2):	25%
Comprehensive Final Exam:	25%

Grades will be on the +/- system and will be based on a class curve with the mean grade equal to a B, but this may be lower if homework performance is low. For example, last semester the B- to B+ range was average total grade +/- 1 standard deviation. After the curve is established, there will be a +/- 4 % grade adjustment based on attendance. This will be discussed in class.

Exams and final exam:

The exam dates will be posted on the Announcements in Blackboard and will be announced at least 2 weeks before the exam. Only material covered up to the exam date will be included. Students should bring a calculator and #2 pencil(s) to all exams. Cell phone calculators are not acceptable. Students may also bring one page of handwritten notes single sided for midterm exams, double sided for the final exam. No other materials are allowed. Students who miss an exam with a valid excuse may take a make-up exam. Make-up exams may not be the same exam the rest of the class took.

Final exam:

The final exam will cover all topics for the semester and will be given in May at the time assigned by the university.

Cheating:

Students found to have cheated on exams will receive a grade of F for that exam. Cheating on attendance will result in a 4% drop in the grade total. All incidents or suspected incidents of cheating will be reported to the university judicial office.

Incomplete grades:

Incompletes will only be given under extraordinary circumstances such as extended illness or call-up to active military duty.

Students with disabilities:

Academic accommodation will be provided as detailed on the Disability Resource Center web page: http://niu.edu/disability/accessibility_statement/index.shtml. In addition, students requesting accommodation are strongly encouraged to contact me early in the semester.

Tentative Calendar:

	Tuesday		Thursday	
January	13	Optics (Ch. 34)	15	Optics (Ch. 34)
	20	Optics (Ch. 34)	22	Optics (ch. 35)
	27	Optics (Ch. 35)	29	Optics (ch. 35)
February	3	Relativity (Ch. 36)	5	Relativity (Ch. 36)
	10	Relativity (Ch. 36)	12	Relativity (Ch. 36)
	17	Exam 1	19	Early Quantum (Ch.37)
	24	Early Quantum (Ch. 37)	26	Early Quantum (Ch.37)
March	3	Quantum (Ch. 38)	5	Quantum (Ch. 38)
	10	Spring Break	12	Spring Break
	17	Quantum (Ch. 38)	19	Quantum (Ch. 38)
	24	Quantum (Ch. 38)	26	Exam 2
Mar. - Apr.	31	Solid State (Ch. 39)	2	Solid State (Ch. 39)
April	7	Nuclear Energy (Ch. 41)	9	Nuclear Energy (Ch.41)
	14	Nuclear Energy (Ch.41)	16	Nuclear Energy (Ch.41)
	21	High Energy Physics	23	High Energy Physics
	28	Review	30	Review

Final Exam May 5

How to Succeed in the Course

Your goals in this course are:

- 1) To understand the concepts which form the basis of modern physics; specifically relativity and quantum mechanics.
- 2) To understand the applications of these concepts to particles, nuclei, atoms, molecules and solids.
- 3) To obtain facility with numerical calculations of quantities related to modern physics.
- 4) To use critical thinking to solve non-trivial problems related to modern physics.

The lectures, textbook readings, and homework problems are all designed to help you achieve these goals. Homework counts for 50% of your grade and is the most important part of learning and comprehension. It is also the best preparation for exams. Homework answers will be posted as soon as the homework is due. Late home works will only be accepted with a medical excuse signed by a physician with appropriate dates.

The hardest part of this course is mastering goal 4. Here are a few hints:

- 1) Don't just read the book; understand what you are reading. This means reading a little and then stopping and thinking about what you just read. Make notes of your own on paper and re-derive equations on paper to test your comprehension.
- 2) Read each chapter at least twice. You will be amazed at how much easier the chapter seems the second time you read it through.
- 3) Don't ask for help with the homework problems, but, rather, ask for help with the concepts you need to do the homework problems.
- 4) Give yourself enough time. You should expect to spend a minimum of 6 hours a week outside of class: 50% time reading/studying the material and 50% time solving assigned problems.
- 5) Persevere and study with classmates; particularly in solving problems. Some aspects of this course are difficult so you should work with someone that you can discuss problems with.
- 6) Have fun! I wouldn't be teaching this course if I didn't love modern physics. It's one of the greatest intellectual achievements of the modern age. There is a lot of really cool stuff here.