SUNY Geneseo, Department of Physics and Astronomy PHYS 342: Advanced Physics Problem Solving

Syllabus, Fall 2016

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Learning Outcomes:

- 1. Make connections between various areas of physics you have studied so far.
- 2. Become prepared to take a comprehensive physics exam such as the GRE Physics subject test, on your own and with very limited support tools.

Times and places:

Lectures: ISC 229, Fri 2:30–4:10pm; Sep 2 through Oct 14 only Final: Not applicable Office hours: Mon 3:00–5:00pm; Wed 2:30–4:00pm; Thu & Fri 1:00–2:00pm; Fri 4:15–5:00pm I am also available at other times; see the schedule on my web site. Just stop by my office, or if you want to ensure that I'll be there, contact me by phone or email.

Required materials:

Textbook: *Conquering the Physics GRE*, by Yoni Kahn and Adam Anderson Textbook: *Schaum's Outline Of Physics For Engineering And Science*, by Michael E. Browne Materials: Access to *Physics GRE Flashcards*, from Case Western Reserve <u>http://www.phys.cwru.edu/flashCards/</u>

Required coursework (with fraction of final course grade):

- 30% Homework: Due at 5:00pm Wednesday.
- 30% Presentations
- 40% Class participation, including in-class mock GRE Exams (course grading based on completion, not Exam score)

General Comments:

- Many courses in the Geneseo physics department encourage collaboration, which is indeed an important skill in research and in the workplace. However, certain types of collaboration may work against preparing you for an individually-taken test. So while practicing don't cheat yourself. You may consult with your classmates (and with me) while working on your homework. But the work that you submit must be your own. While taking practice exams, restrict yourself to little support and finite time.
- Many courses in the Geneseo physics department emphasize **problem solving** over **memorization**. For that and other reasons, exams generally make available tools (equation sheets, calculators, even software). The physics GRE Exams are interested in **conceptual understanding**, but that is different from memorization. They provide you with only one sparse "Table of Information," but memorizing a bunch more information isn't the most important way to make up for that.

Presentations:

Pairs of students will prepare 20-minute presentations that are brief overviews and reviews of specific subject areas. Each student will work on two of these presentations. The subject area for the presentations are defined in the following table.

	ETS Advertised Breakdown	Case Western Flashcard Breakdown	
1	Classical Mechanics (20%)	Classical Mechanics	
2		Mathematics and Statistics	
	Optics and Wave Phenomena (9%)	Oscillations	
		Wave Optics	
		Ray Optics	
3	Electromagnetism (18%)	Electromagnetism	
4	Quantum Mechanics (12%)	Quantum Mechanics & Atomic Physics	
	Atomic Physics (10%)		
5	Thermodynamics and Statistical Mechanics (10%)	Thermal Physics	
6	Special Relativity (6%)	Special Relativity	
	Laboratory Methods (6%)	Laboratory & Electronics	
7	Specialized Tarriag (00%)	Condensed Matter	
		Nuclear and Particle Physics	
	Specialized Topics (9%)	Cosmology	
		Fluids	

Expected Calendar HOMEWORK

			IN CLASS	HOMEWORK	GRE EVENTS
Aug.	12	F			Registration Deadline (A)
	19	F			Late Registration (A)
Sept.	2	F	Introduction, Trial Test		
	7	W		1: Formula Sheet	
	9	F	Flash Card Review		
	14	W		Prepare Presentations/	
	17	••		2: Inverse Practice Test	
	16	F	Presentations 1, 2		
	17	S			GRE Test (A; U of R)
	21	W		Prepare Presentations/	
	21	**		2: Inverse Practice Test	
	23	F	Presentations 3–5		Registration Deadline (B)
	28	W		Prepare Presentations	
	20	••		2: Inverse Practice Test	
	30	F	Presentations 6, 7		Late Registration (B)
			(class 3:30 - 4:10)		5
Oct.	5	<u>W</u>		3: Mock Test	
	7	F	In-class Mock ¹ / ₂ lest		
	12	W		4: Question Authoring	
	12?	W?	Mock Test, 6:00–9:00pm		
	14	F	Final Review		
	17	M			scores available online (A)
Oct.	29	S			GRE Test (B; Geneseo)
	28	F			score reports mailed (A)
Nov.	28	M			scores available online (B)
Dec.	9	F			score reports mailed (B)
Mar.	3	F			Registration Deadline (C)
	10	F			Late Registration (C)
Apr.	8	S			GRE Test (C; U of R)
May	8	M			scores available online (C)
	19	F			score reports mailed (C)