

Instructor:

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 Office Hours: 7:30 A.M. – 5:30 P.M. (typically)

Required Texts:

- *College Physics* (2017) by Open Stax
 Chapters: 17–32
 Homework: <http://www.webassign.net>
- *Laboratory Manual for Life Science Physics II*
- <http://www.physics.csbsju.edu/106/>

Grading:

Your grade will be determined by averaging seven scores: total quiz/homework score, total lab score, three exam scores, and the final exam score (which is double-counted). Homework should be completed (using **WebAssign**) by midnight on the following class day. Late homework is assessed a 15% penalty; request online an automatic “extension” to submit late homework. The quizzes are 10 minute in-class exams on just completed material. Missed quizzes cannot be made up. The hour exams include both multiple choice and numerical problems. You may use a single-sided $8\frac{1}{2} \times 11$ ” “formula sheet” to assist you on the exam. The formula sheet should be limited to formulas and definitions—no worked examples. Exam dates are: September 25 (Wednesday), October 30 (Wednesday), and December 4 (Wednesday). If informed in advance, I may be able to accommodate exam conflicts. The final exam will be comprehensive and have a structure similar to the other exams, but proportionally longer. The registrar has scheduled the final exam for 3:30 P.M. Thursday, December 12.

If you intend to take this course S/U, please provide me with a signed, unconditional notification *before* the start of the final.

Questions:

There is no such thing as a dumb question. Questions asked during lecture do not “interrupt” the lecture, rather they are welcomed. I’d much rather clear up a

misunderstanding or further develop a topic of interest than continue a dull lecture.

Remember: you are almost never alone in your interests, your misunderstandings, or your problems. You help your classmates by asking questions! If you don’t want to ask your question during class, that’s fine too: I can be found almost any time in my office (PEngel 132/6) or the nearby labs. Drop in any time!

Topics:

Catalog: An introduction to electricity and magnetism, wave phenomena, atomic and nuclear physics emphasizing applications to biological systems. Topics include electric and magnetic forces and fields, direct and alternating current circuits, light, sound, optical instruments, relativity, quantum physics, atomic spectra, nuclear physics, radioactivity. Intended for non-majors. Prerequisite: 105.

This course completes the survey of physics started in PHYS 105. The topics covered are those selected by Association of American Medical Colleges as important in the life sciences. We will frequently make use of the concepts developed in PHYS 105, particularly the ideas of force, work, and energy.

Unlike many other sciences, physics is grounded in *mathematical* explanations of nature’s behavior. Thus it is often possible to summarize a chapter of physics with a list of equations. While the AAMC says it expects you to be able to apply such equations in multi-step problems, you should understand that physicists do not think of nature as a collection of equations. Rather physicists think of nature in sentences and pictures that interrelate precise concepts. And the best physicists are those that can discover new *fruitful* concepts or new interrelationships between existing concepts. Thus while the famous dead physicist Boltzmann had the equation $S = k \ln W$ carved on his tombstone, it was not the equation that counted, rather the idea of the interrelationship between entropy and probability. You too may benefit by organizing your understanding of nature in terms of the relationship between concepts rather than just memorizing equations as a sequence of symbols.

One final point: it is important to remember that the subject of our study is not the book; it is nature. This course will serve you best if you try to apply what you are learning to the world you experience everyday.

Class	Date	Text	Topics	Exams	Labs	
1	M	Aug 26	17.1–2	sound waves		
2	W	Aug 28	17.3–4	decibels, Doppler		
3	F	Aug 30	17.5–6	interference, standing Waves	Elec. Instruments	
4	M	Sep 2	18.1–3	Coulomb forces	QUIZ 1	
5	W	Sep 4	18.4–8	electric fields		
6	F	Sep 6	19.1–4	electrical potential	QUIZ 2	Sound Waves
7	M	Sep 9	19.4–6	capacitors, combinations		
8	W	Sep 11	19.6–7	energy, current	QUIZ 3	
9	F	Sep 13	20.1–3	current, resistance, Ohms Law		Equipotentials
10	M	Sep 16	20.4–5	electric power, AC/DC		
11	W	Sep 18	21.1–3	resistor combinations, emf		
12	F	Sep 20	21.3, 6	Kirchhoff, <i>RC</i> circuits		DC Circuits
13	M	Sep 23	17–21	Review	QUIZ 4	
14	W	Sep 25	17–21	Sound & Electricity	Exam I	
15	F	Sep 27	22.1–5	magnetic force, field		
Free Days: Monday, Tuesday						
16	W	Oct 2	22.7–11	electromagnetism		
17	F	Oct 4	23.1–4	induction, Faraday, Lenz		Magnetic Fields
18	M	Oct 7	23.5–9	generators, transformers, inductors	QUIZ 5	
19	W	Oct 9	23.10–11	<i>RL</i> circuits		
20	F	Oct 11	23.11–12	reactance, <i>RLC</i> circuits		AC Circuits
21	M	Oct 14	24.1–4	electromagnetic waves, spectrum	QUIZ 6	
22	W	Oct 16	25.1–5	rays, reflection & refraction		
23	F	Oct 18	25.6	images from lenses		
24	M	Oct 21	25.7	images from mirrors	QUIZ 7	
25	W	Oct 23	26.1–3	simple magnifiers, eye		
26	F	Oct 25	26.4–6	microscope, telescope		Lenses
27	M	Oct 28	22–26	Review	QUIZ 8	
28	W	Oct 30	22–26	Circuits & Geometrical Optics	Exam II	
29	F	Nov 1	27.1–3	interference, 2 slits		
30	M	Nov 4	27.4–6	<i>N</i> slits, 1 slit diffraction		
31	W	Nov 6	27.8–8	thin films & polarization	QUIZ 9	
32	F	Nov 8	28.1–6	special relativity		Diffraction
33	M	Nov 11	29.1–4	blackbodies & photons		
34	W	Nov 13	29.5–8	quantum mechanics	QUIZ 10	
35	F	Nov 15	30.1–3	Bohr's atom		Photoelectric Effect
36	M	Nov 18	30.4–5	X-rays & transitions		
37	W	Nov 20	30.6–9	quantum numbers & periodic table		
38	F	Nov 22	31.1–4	nucleus, radioactive decay	QUIZ 11	
39	M	Nov 25	31.4–6	half-life, binding energy		
Thanksgiving Break: Wednesday–Friday						
40	M	Dec 2	27–31	Review	QUIZ 12	
41	W	Dec 4	27–31	Wave Optics & QM	Exam III	
42	F	Dec 6	32.1–6	nuclear applications		Nuclear Radiation
43	M	Dec 9	17–32	Review		
	R	Dec 12	ALL	Final Exam (3:30 P.M.)		

Links to Institutional Policies:

- Course Attendance policy
www.csbsju.edu/academics/catalog/academic-policies-and-regulations/courses/class-attendance
- Statement on accommodations for students with disabilities
www.csbsju.edu/student-accessibility-services/information-for-faculty/syllabus-statement
- Academic Misconduct and Plagiarism
www.csbsju.edu/academics/catalog/academic-policies-and-regulations/rights/academic-misconduct
- Sexual Misconduct
www.csbsju.edu/human-rights/sexual-misconduct/sexual-misconduct-policy
- Title IX policy
www.csbsju.edu/joint-student-development/title-ix