

## General Physics: Light, Electricity and Magnetism, Modern Physics (PHYS 5B)

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Tutoring Center (SQU 142): Mon 2:00 – 3:00  
Office Hours: Tues/Thurs 10:00 – 11:00  
And by Appointment

### Lecture (Both Sections)

Mon, Wed 1:00 PM – 1:50 PM (Mendocino 1015)

### Discussions

Section 2: Tues 8:00 – 8:50 (Sequoia 232)

Section 3: Tues 9:00 – 9:50 (Sequoia 232)

### Course Summary

Physics 5B is the second semester of the algebra-trig based general physics sequence. It covers the subjects of light and optics, electricity and magnetism, as well as a basic introduction to modern physics (special relativity, quantum mechanics, and fundamental particles). This course is designed for certain technical majors, including biology and construction management. The course consists of weekly lectures, discussion section, and laboratory.

### Subject Matter

Electricity and Magnetism: Electric forces/fields, potential, current and circuits, induction, AC circuits

Optics: Wave optics, ray model of light, optical instruments

Modern Physics: Relativity, quantum physics, atoms, fundamental particles

### Required Texts / Materials

*College Physics, 8<sup>th</sup> Edition*, by Young and Geller. [Full Text: 0-8053-9070-7; Volume 2 (chapters 17-30) ISBN: 0-8053-9215-7]. We will only use the material in Volume 2 in this course.

*Mastering Physics*. New versions of the textbook at the bookstore come with student access to Mastering Physics, an online homework and tutorial system. Homework will be submitted via Mastering Physics. If you purchase a used copy of the textbook or a copy from a vendor that doesn't bundle it with Mastering Physics, you'll need to purchase a separate license for Mastering Physics. It can be done online at [www.masteringphysics.com](http://www.masteringphysics.com). The course ID is: MPDEGRAFFENREID17540 (last character is a "zero").

*Physics 5B Laboratory Manual*: Available only from the Hornet Bookstore.

As in Physics 5A, you will need to have a scientific calculator, but it need not be fancy. If it has trigonometric functions, you're good to go. The Texas Instruments, TI-30 is a fine one that only runs about \$10.

## Modus Operandi

Physics 5B is divided into three components: lecture, discussion, and laboratory. You will have lecture and discussion with me and a separate lab instructor. Your lab instructor will provide me your laboratory grade that I will use in determining your overall course grade (Note: I have the right to re-normalize or scale your lab grade – see the grading section below).

We will typically cover one chapter per week. Generally, we'll cover the basic material in two lectures, leaving the Tuesday discussion section to get into more depth and go over specific problems in smaller groups. Research has shown that if you have reviewed the information prior to lecture, you will absorb much more. Therefore, you will be required to read the chapter prior to the first lecture. You will be given a "reading quiz" in Mastering Physics to help motivate you to do the reading before class. Details on the reading quizzes and weekly homework assignments are below.

## Add/Drop Policy

I have the following rules regarding adds and drops. These rules should allow me to maximize the number of students in this course. Missing two discussions in the first two weeks, without prior approval from me, will result in an administrative drop. I will use the pre-semester waiting list generated by MySacState to fill the seats. If you are on the waiting list, you will only be added if you've been attending classes AND can fit into a lab section that also has an opening. Labs will NOT be filled beyond the capacity listed in the schedule due to safety concerns. If I have the opportunity to go beyond the MySacState waiting list, highest priority will be given to seniors with a graduation evaluation showing PHYS5B as a required course. Students attempting to repeat the course have the lowest priority. Everyone signing up at one time have the same probability to add, I will use random numbers to pick people. When I contact you to add (via email) you have 24 hours to get your add paperwork in order; otherwise, I move down the list. You may drop during the first two weeks for any reason. After two weeks instructor permission is required and you must have a compelling reason. Not doing well is not a compelling reason because you have prevented someone else from taking that seat. I'm sorry, but this will be strictly enforced.

## Tentative Schedule

Week	Day	Topic
1	8/31	Syllabus - Introduction
	9/1	Chapter 17 – Lecture (in discussions)
	9/2	Chapter 17 – Lecture
2	9/7	<b>HOLIDAY – Labor Day</b>
	9/8	Chapter 17 – Discussion
	9/9	Chapter 18 – Lecture
3	9/14	Chapter 18 – Lecture
	9/15	Chapter 18 - Discussion
	9/16	Chapter 19 – Lecture

4	9/21	Chapter 19 – Lecture
	9/22	Chapter 19 – Discussion
	9/23	Chapter 20 – Lecture
5	9/28	Chapter 20 – Lecture
	9/29	Chapter 20 – Discussion
	9/30	<b>EXAM 1: Chapters 17 – 19</b>
6	10/5	Chapter 21 – Lecture
	10/6	Chapter 21 – Discussion
	10/7	Chapter 21 – Lecture/Discussion
7	10/12	Chapter 22 – Lecture
	10/13	Chapter 22 – Discussion
	10/14	Chapter 23 – Lecture
8	10/19	Chapter 23 – Lecture
	10/20	Chapter 23 – Discussion
	10/21	<b>Exam 2: Chapters 20 – 22</b>
9	10/26	Chapter 24 – Lecture
	10/27	Chapter 24 – Discussion
	10/28	Chapter 24 – Lecture/Discussion
10	11/2	Chapter 25 – Lecture
	11/3	Chapter 25 – Discussion
	11/4	Chapter 25 – Lecture/Discussion
11	11/9	Chapter 26 – Lecture
	11/10	Chapter 25 – Discussion
	11/11	<b>HOLIDAY – Veteran’s Day</b>
12	11/16	Chapter 26 – Lecture/Discussion
	11/17	Chapter 28 – Lecture (in discussion)
	11/18	Chapter 28 – Lecture
13	11/23	<b>FURLOUGH DAY</b>
	11/24	<b>FURLOUGH DAY</b>
	11/25	<b>FURLOUGH DAY</b>
14	11/30	<b>Exam 3: Chapters 23 – 26</b>
	12/1	Chapter 28 – Discussion
	12/2	Chapter 29 / 30 – Lecture
15	12/7	Chapter 30 – Lecture
	12/8	Chapter 30 – Discussion
	12/9	Chapter 27 – Lecture

## Grading

Homework

20%

There are three components to your homework grade: Reading Quizzes, Homework Sets, and Scratch Pads. They are grouped by chapter. I expect there to be thirteen assignments in the semester (Chapters 17 – 29; Chapters 27 & 30 will be merged into a single assignment). The deadlines for each assignment will be listed clearly on Mastering Physics (except Scratch Pad as described below). I will drop your lowest score in each of the categories in determining your final grade.

- The Reading Quizzes are short questionnaires that you do prior to starting a new chapter. The quiz will be administered on Mastering Physics. They are timed assignments and correct answers will only be shown after the assignment is due. (Note, for the first assignment, I am giving several extra days to give folks the chance to get your Mastering Physics in order.) The Reading Quiz is worth 20% of the homework.
- Homework Sets are weekly problems to test your understanding of the material. They are also done on Mastering Physics. They are designed to be about two to three hours long, but it may take more or less time to do them. There are “tutorial” problems that are unique to MP and end of chapter problems (calculations are the majority, but there are also some multiple choice, ranking, short answer, and maybe even be a few essay questions). Please do the Introduction to Mastering Physics assignment to practice the different types. They are automatically graded (except essay questions) and generally give you five opportunities to get the right answer, with a deduction for each wrong attempt (See Mastering Physics for grading details). They are due several days after we have finished discussing a chapter, the exact due dates are listed in MP. Late homework will be accepted, but with a very significant penalty (described in MP). Solutions to a portion of the problems will be posted in my solutions display case on the second floor of Sequoia Hall. The Homework Set is worth 60% of your weekly assignment.
- The Scratch Pad is worth the remaining 20% of your chapter assignment. It should consist of the notes that you used in doing the Homework Set. This gives me the opportunity to review your problem solving process and to make suggestions to you if you have problems. I will not look at every single problem, but will rather scan through and check your work. It will be graded on a 0-2 point scale: 0 – very poor work, 1 – okay, but your approach to solving problems could be significantly improved, and 2 – very nice approach to solving problems. If you consistently get 0 or 1, you should come by office hours and/or hit the tutoring center. These need to be turned in to me (in person or via my dropbox) within 24 hours of submitting your Homework Set (unless prior arraignments have been made with me).

Laboratory 10%

Each lab instructor will provide a syllabus describing how they will assess the laboratory portion of the class. They may consult me in designing their grading system, but ultimately it is their system. However, grade from laboratory instructor may be normalized to adjust for significant differences in the grade distributions among the laboratory instructors.

Midterm Exams 15% Each

There will be three exams during the semester. The tentative dates are 9/30, 10/21, and 11/30. Exam 1 will cover chapters 17-19, Exam 2 covers chapters 20-22, and Exam 3 covers chapters 23-26. Laboratory experiments performed by the date of the exam are also fair game for questions on the exam.

The exams will have numeric problems, short answer questions, and multiple-choice questions. I will provide you with a sheet of equations and constants. I will post it on my website at least one week before the exams so that you know what information you will be given. You will be allowed

the use of ONE 3" x 5" note card during the exam. It must be hand written. They will be turned in with the exam.

You may any scientific calculator on exams, but I reserve the right to inspect them to make sure that no unauthorized material is stored on it (that is what your note sheet is for). I also reserve the right to reset the memory of or impound any calculator that I suspect is being used improperly. PDAs, PHONES, and BLACKBERRYS are forbidden to use during exams. If I see you using one you will fail the exam (if extenuating circumstances exist, you must inform me before the exam begins).

Final Exam 25%

The final exam is comprehensive, including all chapter previously tested plus any new material introduced after Exam 3. You will have the equation and constant sheets provided to you. On the final exam you may use two 3" x 5" cards. They still must be handwritten. Same calculator rules as the midterm exams.

Per the university exam schedule, this final for this course is scheduled for Monday December 14 @ 12:45 – 2:45. The final will be administered in Mendocino 1015, our usual lecture room (unless otherwise announced at the end of the semester).

Final grades will be given as follows:	A: 100% – 85%
(Pluses & minuses <u>may</u> be	B: 85% – 75%
assigned on to those right	C: 75% – 65%
on the edges of the grade	D: 65% – 55%
bands.	F: Below 55%

The distribution of scores at the end of the semester may encourage me to further lower the grade designations, but I guarantee these bands as a minimum.

### Academic Dishonesty Statement

The Department of Physics and Astronomy has unanimously approved the following statement:

"The faculty of the Department of Physics and Astronomy will not tolerate academic dishonesty. Falsification of data, copying, unauthorized collaboration, plagiarism, alteration of graded materials, or other actions (as described in, but not necessarily limited to the Sacramento State Policy Manual) *will be promptly reported to the Office of Student Affairs*. The offending student will be penalized on the assignment in question. Serious infractions will result in course failure and a recommendation for administrative sanctions."

If you have any questions regarding this statement, please come and speak with me about it.

### Additional Information

If you have a disability and require accommodations, you need to provide disability documentation to SSWD, Lassen Hall 1008, 916-278-6955. Please discuss your accommodation needs with me after class or during my office hours early in the semester.

## Odds and Ends

I encourage you to work together on homework problems. That said, sitting in a study group and just copying solutions will not likely enable you to get good results on the exams. Getting 100% on the homework and 40% on the exams will not earn you a good course grade.

I have selected homework problems that I feel are, for the most part, representative of the material that you should know to pass this class. That said, there are generally one or two problems that will be very challenging. They are not meant to be punishment or to embarrass you, many people like to test themselves against hard problems and they are there for this reason.

Please clearly write your name and also indicate your discussion section number or meeting time on all things that you hand in to me. It is much faster to hand things back to you in discussion and this will help me separate them.

While attendance is not mandatory for lecture and discussion (aside from first two weeks as noted in add/drop policy), keep in mind that I may emphasize material in lecture that the text does not. I also might give hints and tips.

Your laboratory instructor sets the policies in the laboratory portion of the class, with the exception of the grading issues noted above. In that room, he/she's the boss.

Per department policy (effective Fall 2004), no laboratory exemptions will be given. Please don't waste either of our times explaining why you deserve an exception to a policy that explicitly says "no exceptions."

Please respect your classmates and me by turning off your cell phone during class. If you are expecting an emergency call (i.e. pregnant wife), please let me know. I was in that boat a couple of years ago and understand. Repeated violators will be noted by me and are subject to a grade reduction.

I check my email very regularly during the week and at least a couple of times on the weekend. This is a good way to reach me. I am also often available in my office outside of office hours.