

Physics 3B Syllabus – Spring 2019

Instructor: Andrew Combs

Office: Rm A-272

Office Hrs: TTh 10:10am-10:55am, and T 12:55pm-1:25pm

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Prerequisite: Physics 3A, Math 3A calculus

Texts: Required: Physics for Scientists and Engineers, 4th Ed., Giancoli, chpt 21-42

Class Schedule:

Lecture: TTh 11:00am-12:50am A-273

Lab: Th 1:00pm-3:50pm A-274

Course Description:

This is a course in electricity, magnetism, optics, and modern physics using algebra and trigonometry with some calculus. Lectures are oriented toward problem solving and are typically based on examples, class-exercises, and the homework problem set for the week. That is the best time to raise questions specifically on the problem set given. Unless otherwise stated, we will typically follow the chapter progression of the text. Lectures will be by black-board presentation, with concepts or derivations followed up by problem solving.

I prefer interaction during the lectures. If you have questions, please ask them. If you ask a question that is beyond the scope of the lecture, I'll try to answer your question after class. Be a serious student. I would like everyone to get an A. You will maximize your chances for an A with good preparation, coming to class and engaged with the classwork, and being diligent in your labs and homework.

Student Learning Outcomes

1. Explain and discuss both verbally and in written language the physics concepts listed in course content, as well as their relevance to everyday events and circumstances in a broad interdisciplinary context. Course content consists of electromagnetics, DC and AC circuits, EM waves, light, relativity, quantum physics of atoms, molecules, nuclei.
2. Use algebra, trigonometry, and calculus to set up mathematical descriptions of physical systems and to calculate measurable quantities that provide an understanding of the physical environment in terms of the concepts listed in the course content. Course content consists of electromagnetics, DC and AC circuits, EM waves, light, relativity, quantum physics of atoms, molecules, nuclei.
3. Set up laboratory equipment safely and efficiently, plan and carry out experimental procedures, identify possible sources of error, implement techniques that enhance precision, reduce and interpret data, and report verbally and in written language the experimental data, results, and assessment of reliability. Course content consists of electromagnetics, DC and AC circuits, EM waves, light, relativity, quantum physics of atoms, molecules, nuclei.

Grading

Success is achieved through devotion, more than anything else. If you prepare well through diligent effort, it will reflect in your grade. It is expected that you will 1) prepare for class by reading

the text ahead of time and *doing all sample problems*, 2) coming to all the classes with your calculator prepared to ask questions and do any assigned class-work individually, and 3) doing all the labs and homework on time. You will improve your chances for a good grade by working with classmates on concepts, coming to me during office hours with questions.

By the way, did I say prepare for class ahead of time by doing all sample problems? You see, it is my experience that learning is a *physical* activity. The later enhances focus, and focus is the key to having one mind, which in turn is a principle factor in being successful at any task. I suspect the time to generate good neural networks in your brain is significantly shortened by actually having give and take with a pencil and paper to write out notes and do problems. Those networks are considerably strengthened and broadened by repetition. Thus, the first exposure you have to course material should *not* be when you come to class. That should be your *second* exposure (at a minimum), i.e., after you've done the sample problems. Your next exposures should include class-work, homework, a lab, a quiz, then a mid-term. That's six rounds of exposure before the seventh exposure - the final exam. You should be close to nailing it by then. Do not short-change yourself. Furthermore, your diligence will rub off on others, and help the whole spiritual and intellectual atmosphere in the class.

Unless specifically and otherwise specified, the last day for handing in any assigned work (e.g., late homework or labs) is the **last day of lecture – Thurs, May 16th**. An exception will be the optional extra credit and the last homework which may be handed in at the beginning of the final exam part II, Thurs May 23rd.

The grading will be calculated as follows:

Homework:	7.5%	
Quizzes:	10%	
Class-work:	7.5%	
Class participation:	± 1%	
Lab Reports:	20%	
2 Mid-terms:	30%	Test I – late Feb; Test II – mid Apr
Final	25%	Comprehensive
		Part I – last lab period Thurs May 16 th
		Part II - Thurs May 23 10:00am-12:00pm
Optional Bonus	up to +3%	

Grading scheme: $A \geq 90$, $90 > B \geq 80$, $80 > C \geq 70$, etc.

You may earn **extra credit** by doing an optional bonus project that may be delivered as a short research paper (delivered separately from homework) on a topic of interest to you, and pertinent to the course content, but going beyond the course material itself (no credit is given for regurgitating class work or course content). It should be five pages or less. Content is judged on physics content, professional quality (style, grammar and spelling, annotation), and novelty.

There will be **no make-ups for mid-terms, quizzes or class-work**. I will drop one home-work, one quiz, one class-work assignment, and one lab, but both mid-terms will count toward your grade. Test and quiz scores may be curved up if the class average falls below a certain value. Otherwise, expect the normal number ranges to apply to letter grades. Expect late work to be reduced in grade (but better late than never). No incompletes will be granted, as per college policy, unless a verified

emergency causes you to be unable to finish a course – you cannot fail to show up for mid-terms or finals and expect to somehow take it later.

Homework

Homework will typically be assigned each week, although that requirement will be adjusted if a chapter was not sufficiently covered in lecture/discussion before the assignment is due. Homework will typically be due at the beginning of lecture one-week following assignment. Homework can be hand-written, but should be neat. Homework is not graded, but all work should be shown, as credit will be given for each problem attempted only if work is shown.

Class-work

Like homework, class-work is given credit for problems attempted during a class-work assignment – problems that you try individually and in groups during class time. Unless otherwise stated, these are handed in at the end of class when the assignment is given.

Quizzes

Quizzes will typically occur the day homework is handed in. Content largely follows problems or derivations covered in the class lecture, homework, examples or prominent derivations in the book. I am fond of selecting a short derivation or problem out of a previous lecture or class-work for a quiz. They will be about 50 minutes, and will test your understanding of concepts through problem solving or derivations.

Labs

Lab assignments are of two basic types: the lab exercise and full lab report. The difference is the lab exercise has a hand-out form to be filled in with observations and calculations and typically only one is done for the entire group; the full lab report is required from each individual, must be typed (except possibly for derivations or equations) in a specific format that will be discussed during the first lab meeting. The group report, on the other hand, is not to be typed - only the "hand-in" sheet distributed with the lab will be accepted (plus any appropriate attachments). It should be noted that the full lab report can have *no elements copied from fellow students* including those in your lab group; while all students in a lab group are expected to share data and calculations any text or derivations that are copied or Xeroxed are considered to be plagiarism - so be careful about that.

The full report has more weight in grading than the the lab exercise (ratio 3:2). Both are due the lab period following the week of the lab execution. Of course, you must be present during the lab period to receive credit for a lab assignment. Emphasis in grading is on 1) reporting of error, uncertainty and their comparison to test theoretical predictions, 2) significant figures, and in the full report 3) completeness of form and clarity of exposition. In addition, there may be specific questions asked in the lab handout that require answers which will also be graded. Extra credit may be given if work is exceptional. Unless otherwise stated, the full lab report must be typed, although equations may be written in by hand.

Mid-term and Final Exams

There are two mid-terms and a final exam. Together they comprise 55% of the grade. They will test understanding of concepts through problem solving and derivation. Each mid-term will be given during the lab time, and will be accompanied by a review session preceding them. The review session will consist of going over solutions to a practice test.

General

You may lose credit if you hand things in late; moreover, you will lose effectiveness in your preparation for both quizzes and tests. Students sometimes fail to do all the homework or all the labs; typically many fall behind in mid-term, and try to hand things in late later in the term. This usually will have an impact on your performance on the final exam. So, avoid getting behind or handing things in late – it will often make the difference between an A and a B, or a B and a C.

Unless specifically stated otherwise, smart phones and laptops distract are not to be used during lecture - they serve as a distraction to either you or fellow students. Repetitive lateness is disruptive to the educational processes and as such may be cause for being dropped from the course, so be on time. Also, as per college policy, excessive absence (beyond 2 weeks of class) can be cause for being dropped.

If a student does not attend class the first day, he will be dropped in favor of any on the wait list. For those students who later decide to drop, it is *the student's* responsibility (not the instructor's) to officially drop the class.

Academic Integrity:

We are happiest when we are “clean inside”, when we live lives of honor for the sake of others. That is when we become truly reliable and responsible men and women who can benefit the world.

Your grade on the explicit write-ups of homework and labs, and on your quizzes, mid-terms and the final, is an evaluation of your understanding of course material. To be evaluated in this course, it must be based upon your work, not other's work. So here are some activities that are ***not allowed*** in this class:

- Using any kind of notes (e.g. on hand, on desk, in calculator) during a quiz
- Copying or looking at another's work, or encouraging or allowing another to look at your work, during a quiz or exam
- Sharing a calculator during a quiz or exam
- Copying another's lab report work for inclusion in your own lab report
- Collaborating on the wording of the written portions of your lab report
- Copying another's homework
- Assisting another to violate any of these guidelines

Here are some activities that ***are allowed and encouraged*** in this class:

- Using notes during an exam (1 sheet 8.5x11 (front) for mid-terms, final part II, final part I - section A, and final part I - section B)

- Learning how to use the functions of your calculator (e.g. quadratic formula, graphing)
- Collaborating on the data analysis and calculations for a lab report
- Discussing goals of a lab and general outline of a lab report
- Asking anyone to proof read your rough draft of the lab report
- Explaining how to do a homework problem to any classmate
- Checking your homework problem answers with another student, or any other source

If I catch you committing an act of academic dishonesty, as outlined above, I may give you a zero on the assignment in question and report you to the Dean of Student Life. If more than one instructor reports you to the Dean for cheating, you may be expelled from Laney College and your transcript permanently marked for cheating. If this is an isolated incident, nothing more will come of it. If I catch you committing a second act of academic dishonesty, I may give you a zero on the assignment, report you to the Dean again, and lower your final course grade by one full letter grade.

Tentative Homework Assignments:

Chapter	Problems	Chapter	Problems
21	1,2,12,13,22	32	3,12,17,23,25,45,48
22	1,5,6,9,13,15,18	33	1,6,8,23,63
23	1,2,6,14,18,26,31,48,61	34	2,3,9,12,23,26
24	2,4,11,16,29,37,59	35	3,10,33,52
25	1,4,7,12,40	36	1,5,7,19,25,36,41,43,55
26	1,2,6,16,17,27,32	37	1,7,16,29,35,56,59,63
27	1,3,6,10,14,16,17,20,29	38	5,11,13,18,27
28	3,4,7,11,18,31	39	3,7,29,33
29	1,3,4,9,12,28,29,38	40	1,9,13,15
30	7,17,48,60	41	4,11,17,21,27,33,45,47,51
31	9,11,13,19,23,29	42	3,4,11,28,29,37,42,53,57

Tentative Lab Period Schedule:

wk	Lab	wk	Lab		
Jan 21	1	lab report, simple tape electroscope	Apr 1	holiday	
28	2	Problem solving	8	11	Review for Mid-term II
Feb 4	3	electric fields and equipotentials	15	12	Mid-term Exam II (chpt 29-36)
11	4	resistance and current	22	13	go over test; problem solving
18	5	Review for Mid-term I	29	14	emission spectrum of hydrogen
25	6	Mid-term Exam I (chpt 21-28)	May 6	15	radioactivity
Mar 4	7	go over test; problem solving	13	16	Final Exam Part I – Thurs May 16th
11	8	impedance	20	17	Final Exam Part II (chpt.37-42) Thurs May 23th 10:00am-12:00pm
18	9	flex			
25	10	interference and diffraction			