

Parkland College

Physics Courses

Natural Sciences Courses

2015

Physics 143 Modern Physics Spring 2015

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Recommended Citation

Brenner, Matthew, "Physics 143 Modern Physics Spring 2015" (2015). *Physics Courses*. Paper 21.
http://spark.parkland.edu/physics_course/21

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Physics 143 Spring 2015 Syllabus

Instructor: Dr. Matthew Brenner

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Office Hour: Wednesday: 5:50-6:50 PM, Room M126

Text: *Fundamentals of Physics, 9th edition, extended, by Halliday, Resnick and Walker.*

Prerequisite: PHY 141 and 142, or equivalent; Calculus 2 or equivalent.

Materials: You will need a calculator that can do algebraic and trig functions, as well as statistical functions. A TI calculator would be preferred.

Content: This course is primarily a survey of wave physics, with some nuclear and conduction of electricity in solids topics at the end. We'll start out with pretty quaint stuff like waves moving along a string and waves rippling across a pond, and progress to wave concepts that will challenge your view of reality. In general, this course is cumulative. Once you get past the discussion of standing waves in chapters 16 and 17, don't just forget that material. It will be back in chapter 39, and if you don't have a solid handle on it by then, you will have trouble with the later material.

From the textbook, we will cover chapters 15, 16, 17, 33, 34, 35, 36, part of 37, 38, 39, 40, 41, 42, and 43. Chapter 44 may be covered a little bit if time allows and there is interest in doing so.

I expect you to have already learned good problem-solving techniques in PHY 141, so I will not spend much time on those basics in this class. I will also not spend much time reviewing concepts from PHY 141 and PHY 142. I expect you to be familiar with problems involving Newton's Laws, Conservation of Momentum (linear and angular), Conservation of Energy, basic thermodynamics, and basic electrical and magnetic interactions. If you are weak in any of these areas, be sure to plan for some individual review time during this course, especially PHY 141 material. There are questions which are very difficult if you do not have a firm command of this material. In particular, if you do not have a very good grasp of all the material in chapters 1 – 12 of the textbook, you will need to brush up. This is the type of course that builds in a pyramid-like fashion. The material in the latter stages draws heavily on the early stuff. The good part about that is that review is ongoing. The bad part is that a lack of understanding of early things will haunt you down the line.

Grades

The grades are compounded in the following way:

Quizzes	5%
Participation	5%
Homework	15%
Labs	10%
3 exams	45%
Final exam	20%

Letter grades will be assigned as follows: A – 90%, B – 80%, C – 70%, D – 60%.

* You must earn 60% on the laboratory part of the course to receive a passing grade for the course.

Overall Schedule (In class Labs are in Bold, Exams in Red):

	Chapter	Monday	Wednesday
Week 1: 1/12	15	Introduction, Simple Harmonic motion	Simple Harmonic Motion/Springs
Week 2: 1/19	15	NO CLASS (MLK Jr.)	Jupiter's Moons
Week 3: 1/26	16	Waves (Traveling, Standing)	Waves (Traveling, Standing)
Week 4: 2/2	17	Sound Waves	Standing Waves
Week 5: 2/9	17	Resonance in Air Column	Exam I (Feb. 11th)
Week 6: 2/16	33	Electromagnetic Waves	Electromagnetic Waves
Week 7: 2/23	34, 35	Geometric Optics	Geometric Optics and Interference
Week 8: 3/2	35	Interference	Basic Optics and Telescope
Week 9: 3/9	36	Diffraction	Virtual Objects and Interference and Diffraction
Week 10: 3/16	37	Basic Relativity	Exam II (Mar. 18th)
Spring Break			
Week 11: 3/30	38, 39	Quantum Mechanics	Quantum Mechanics
Week 12: 4/6	39	Quantum Mechanics	Spectra—Balmer Series
Week 13: 4/13	40	More Quantum Mechanics	Atoms
Week 14: 4/20	40, 41	Atoms	Conduction of Electricity in Solids
Week 15: 4/27	42	Exam III (Apr. 27th)	Nuclear Physics
Week 16: 5/4	42, 43	Radioactivity, Nuclear Energy	Course Review
FINAL EXAM: Monday May 11th from 2-4pm			

* Instructor reserves the right to modify the schedule as the need arises

Lectures, Quizzes, Homework, Exams

We will generally have lectures both on Mondays and sometimes on Wednesdays when there is no lab or right before the lab begins. It is my expectation that you will do some preparation before we discuss a topic in class. Before that class, I expect you to have completed the reading assignment. This includes not only reading the chapter, but understanding the sample problems and trying to answer the Checkpoints as well as the end-of-chapter Questions. You should also try to start a homework problem or two. With this level of preparation, we can make better use of our class time. I will use the 'lecture' time to emphasize chapter highlights or items that students have struggled with in the past, answer questions, and perhaps work through some example problems and problem-solving strategies. Note that everything in the text is fair game, whether or not I cover it in class, unless I specifically announce otherwise in class. Also fair game is material I cover in class that it not in the text. Immediately following classroom discussion of a topic, you will have the opportunity to work some problems in small groups. You will work in groups of 3-4 people, and these should take around an hour to complete. The discussion problems will typically be similar to or at least related to the homework assignment for that chapter. The discussion sessions serve as a great time to become more comfortable with the material and learn how to better work with the material. Besides attending class and participating during lecture, part of the participation grade will be determined by how well you work in your group as a group. There will also periodically be an opportunity to earn extra credit during the discussion problems.

There will be quizzes most weeks which will have two types of questions. First, there will be review questions that relate to the lecture material, homework, and discussion problems from the previous week. These will typically be problems involving calculations. Second, there will be questions regarding the current week's material that will test whether you have read the chapter that will be covered that day in class. There will not be quizzes during exam weeks. Quizzes will take place at the beginning of class. The

lowest quiz grade will be dropped. If you are more than 10 minutes late to class you will get a zero for the quiz.

Homework is generally due on Mondays before the lecture starts unless I say otherwise. Each homework assignment will primarily consist of problems from the text book. The lowest homework grade will be dropped. I will randomly choose one homework problem to grade, which will be worth approximately half of the homework grade. The other half of the grade will be determined by completion of the other problems, but will not be graded in detail. The homework assignments will be posted in COBRA.

There are three exams during the semester and one final exam at the end of the semester. There will be no make-up exams or make-up final exam after the exams are offered. If you need to take the exam early, please let me know by email.

Laboratory

Labs will generally be held on Wednesdays and sometimes on Mondays. Each lab week there will be a handout distributed at the start of the lab session that will outline your experiment. It is important that you arrive on time to begin your lab session. The door will be closing 10 minutes after the class begins. Lab reports must be handed in before you leave the lab. I allow you to drop your lowest lab grade from the set of both in class and virtual labs. Data that you include must be legitimate data collected during the lab session. Lab reports which are copied in part or full will be considered cheating and may result in a zero for the lab. You must earn 60% on the laboratory part of the course to receive a passing grade for the course.

Extra Credit

There will be a few opportunities to earn extra credit throughout the semester.

Late assignments and excused grade policy

I do not accept any late assignments under any circumstances. If you are too sick to come to class to turn in your assignments, please email me before class starts and bring a doctor's note to the next class you attend and then your grade will be excused (counts as your average score). Sometimes accidents can happen and that is why I allow you to drop the lowest quiz, homework, and lab score. There will be no make-up quizzes, exams, homework, or labs under any circumstances. Approved and documented absences due to medical reasons, death in the family, etc. are, of course, unpredictable, and allowances will be made.

Disability

If you believe you have a disability for which you may need an academic accommodation (e.g. an alternate testing environment, use of assistive technology or other classroom assistance), please contact: Cathy Robinson, Room U-260, 217-353-2338, disabilityservices@parkland.edu.

Center for Academic Success

If you find yourself needing assistance of any kind to complete assignments, stay on top of readings, study for tests, or just to stay in school, please contact the Center for Academic Success in D120 at 353-2005 or 351-2441. You may also email the CAS at CenterForAcademicSuccess@parkland.edu.

Academic Honesty

There has been an increase in the frequency of cheating incidents in recent years, although I am fortunate to have never had to deal with it myself. The Student Policies/Procedures Manual (www.parkland.edu/studentpolicy/honesty) defines cheating, fabrication, and plagiarism. Consequences can carry the penalty of a failing grade for the course and possibly suspension from the course.

Core Values

I believe strongly in the Core Values espoused by Parkland College: Honesty and Integrity, Fairness and Just Treatment, Responsibility, Multiculturalism, Education, and Public Trust. Essentially, these values set guidelines for how we should treat one another. Failure to be respectful of one another or to maintain ethical behavior will not be tolerated.

Drops/Withdrawals

After the census date, I am required to assess your attendance. If you have not attended regularly to that point, you will be dropped with no refund of tuition or fees. After the census date, you should not plan on an instructor withdrawal if you want to withdraw from the course. You are ultimately responsible for your own withdrawal by the withdrawal date. Non-attendance after the census date will result in an F if you don't withdraw yourself. Check the academic calendar for withdrawal deadlines. You are also responsible for reading and understanding the Spring 2015 Syllabus Addendum, which can be found on the front page of the course COBRA page or at this URL: https://cobra.parkland.edu/shared/shared_content/files/syllabus_addendum.html