

Parkland College

Physics Courses

Natural Sciences Courses

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Physics 143 Modern Physics Fall 2015

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Physics 143 Fall 2015 Syllabus

Instructor: Dr. Matthew Brenner Office: L240, 351-2285 x2628

Email: mbrenner@parkland.edu Office Hour: Mon or Wed (in class day): 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 we 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, part of 41, 42, 43, and part of 44.

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 this 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 (Labs are in Bold, Exams in Red):

	Chapter	Monday	Wednesday
Week 1: 9/14	15	Introduction Simple Harmonic Motion/Springs	*Simple Harmonic Motion*
Week 2: 9/21	16	*Waves*	Jupiter's Moons
Week 3: 9/28	17	*Sound Waves*	Standing Waves
Week 4: 10/5	33	Resonance in Air Column	*EM Waves*
Exam I: Monday Oct. 5th In Class Lab Assessment I: Wednesday Oct. 7th 3-4 pm Testing Center (Sound Cavity and Oscillatory Motion of String Points in a Standing Wave)			
Week 5: 10/12	34	*Geometric Optics*	Basic Optics & EM wave
Week 6: 10/19	35	*Interference*	Virtual Objects
Week 7: 10/26	36	*Diffraction*	Interference and Diffraction & Phasors
Week 8: 11/2	37	Telescope	*Basic Relativity*
Exam II: Monday Nov. 2nd In Class Lab Assessment II: Wednesday Nov. 4th 3-4 pm Testing Center (Two-Lens System and Interference Pattern)			
Week 9: 11/9	38	*Photons/Matter Waves*	Photons/Matter Waves
Week 10: 11/16	39	*Quantum Mechanics*	Spectra—Balmer Series
Week 11: 11/23	40	*Atoms*	Atoms
Week 12: 11/30	41	*Conduction of Electricity in Solids*	Exam III Lab Assessment III (Spectral Analysis)
Week 13: 12/7	42, 43, 44	*Nuclear Physics*	Radioactivity, Nuclear Energy, Elementary Particles
FINAL EXAM: Monday Dec 14th from 2-4pm In Class			

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

** The double asterisk surrounding a topic means you are to watch the **ONLINE LECTURE** that day and taking the corresponding quiz. All other class periods are to meet **IN CLASS**.

Lectures

Lectures will generally be given online and should be watched on the day indicated on the schedule typically during the normal class meeting time. It is my expectation that you will do some preparation before viewing a lecture online or discussing a topic in class. 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 the homework problems.

With this level of preparation, we can make better use of the lecture and our class time. I will use the lecture time to emphasize chapter highlights or items that students have struggled with in the past and 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.

Discussion

While you view the lectures online, you will have the opportunity to ask and respond to questions on the discussion board on the Cobra website. On in-class days, I will address additional questions. We will also work on discussion problems in groups of 3-4 people. 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 it. Besides attending class and watching lectures, part of the participation grade will be determined by how well you work in your group as a group. There will also periodically be opportunities to earn extra credit during the discussion problems.

Quizzes

There will be quizzes after each online lecture. The short answer/multiple choice quiz questions will be periodically spoken during the lecture and you must submit your answers on Cobra by 10:00 pm the day the lecture is assigned. These lecture quizzes will comprise 50% of the total quiz grade.

There will also be periodic in-class review quizzes that are related to the lecture material, homework, and discussion problems from the previous topic. These will typically be problems involving calculations. These quizzes will take place at the beginning of class and will make up the other 50% of the quiz grade. 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. Quiz announcements will be posted in COBRA.

Homework

Homework will be assigned for each chapter covered in the course. You will generally be given one week to complete the homework assignment. Each homework assignment will be due at the beginning of the class period and will primarily consist of problems from the text book. The lowest homework grade will be dropped.

Grading: 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. Below you will find the list of homework problems that will be assigned from each chapter:

Chapter 15	16, 17, 22, 33, 39, 42, 47, 48, 50, 52, 58, 61, 87
Chapter 16	9, 21, 26, 29, 31, 37, 48, 51, 52
Chapter 17	7, 13, 19, 21, 35, 43, 47, 53, 59, 69
Chapter 33	15, 26, 27, 29, 37, 51, 59, 70
Chapter 34	10, 11, 39, 52, 53, 61, 83
Chapter 35	11, 23, 27, 31, 34, 43, 63, 81
Chapter 36	9, 17, 29, 39, 51, 57, 60, 71
Chapter 37	5, 13, 23, 31, 39, 51
Chapter 38	13, 19, 31, 45, 51, 57, 65, 68
Chapter 39	9, 15, 17, 27, 39, 45, 51, 55
Chapter 40	7, 11, 16, 17, 25, 31, 35, 37, 51, 59
Chapter 41	11, 28, 31, 35, 51
Chapter 42	14, 37, 50, 55, 63
Chapter 43	11, 13, 41
Chapter 44	3, 5, 9

Exams

There are three exams during the semester and one final exam at the end of the semester. Each of these exams will include two lab assessment questions. 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

Pre-labs will be handed out one class period before the lab meets and will be due at the beginning of the lab session. The lab handout will be distributed at the start of the lab session and 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. The lab grade is a combination of the pre-lab and the lab. I allow you to drop your lowest lab grade. 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 U264, 217-353-2082, crobinson@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

At the census date, I am required to assess your attendance. If you have not attended regularly to that point, you will be withdrawn with no refund of tuition or fees. After the census date, if you cease to attend, I may withdraw you at or before the midterm. You are ultimately responsible for your own withdrawal by the withdrawal date. Non-withdrawal where you stop attending will result in a grade. 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