

# West Chester University

## Physics 100-05: Elements of Physical Science Spring 2012

**Course Overview:** We interact with the physical world all the time—when we walk, when we drive, as we work, even when we rest. Our body is a physical object too, which we use to go where we want and manipulate the objects we want. But what of things like cars, refrigerators, and laptop computers: do they operate and move according to the same “rules” that make our bodies move as they do? What are those rules, anyway? And how could we use knowledge of such rules to make better predictions about what will happen when we interact with the physical world around us? We will attempt to answer these questions during the course of our studies in PHY 100.

PHY 100 examines the application of modern physics to various aspects of our everyday lives. A particular emphasis will be placed on energy: what types of energy there are, how energy is transferred, and whether or not it can be “made.” Our ultimate goal is to understand how quantitative models of the physical world are constructed, tested, and modified or discarded. We will begin by considering what a model of the physical world is, and learn the mathematical language by which we can ask questions of and receive quantitative answers from the natural world. From there, we will study the modern theories of motion, rotation, and gravity which allow us to make sense of how and why things in the world around us move. We will then discuss energy, entropy, and vibrations. Lastly, we will turn our attention to electricity and magnetism to get a feel for how the many electronic devices we use in our modern lives work. Throughout the course, we will develop and build analytical reasoning and problem solving skills which are widely applicable to our modern life.

**Course Credit:** This is a 3 unit course.

**Course Requirements:** This course has no prerequisites. However, we will be using some basic algebra at the high school math level; I will assume that you have done this sort of math before, though it may be a few years since you've seen it or used it. We will also be making, reading, and interpreting diagrams, which I will assume that you have some experience doing.

**Meeting Times:** Monday, Wednesday, Friday from 1:00 PM to 1:50 PM  
Merion Science Center, room 109

### Required Course Materials:

- Physics: A Conceptual World View, 7th Ed., by Kirkpatrick & Francis (Thompson, Text: Brookes/Cole, 2010)
- A calculator that is *not* part of an iPod/iPad, cell phone, etc.
- A-B-C-D cards, which will be handed out the first day

### Instructor Information:

Dr. Michelle A. Caler

office: 135 Merion Science Center

office hours: Mondays, Wednesdays, and Fridays from 11:00AM–12:00PM

Tuesday and Thursday from 1:00–2:00PM

... and by appointment

email: mcaler@wcupa.edu

office phone: 610-436-2320

webpage: This course has a D2L webpage. The syllabus and all other related course materials will be posted to this webpage. Please let me know if you are unable to access it. Being able to access the D2L webpage will be critical to student success in this course.

**Course Goals:** The ultimate goal of PHY 100 is for you to gain an understanding of and appreciation for the methods of science, and how ideas from science influence our day-to-day lives. One of the ways we will accomplish this goal is by building up an understanding of how and why various physical phenomena occur. The emphasis will be on the sorts of processes and interactions we encounter on a regular basis. In particular, we will examine linear motion, rotational motion, heat, vibrations, electricity, and magnetism. While I hope that you will gain an appreciation for these topics and how they explain processes in the world around us, our larger goal in studying them is to illustrate how the methods and ideas of science inform our understanding of the natural world. Over the course of our studies, we will try to develop a qualitative understanding of our physical model of the natural world; additionally, we will learn how to make quantitative predictions using the mathematical laws which form its foundation.

As we work to achieve these goals, I will be emphasizing the ability to reason with and work with concepts and equations rather than strict fact memorization or complicated mathematics. (We will need to memorize some terms, though.) In doing so, we will learn analytical thinking skills, how to make connections between concepts, and how to communicate your reasoning to others. We will also be making quantitative predictions about phenomena, which *does* require some basic mathematical ideas. These ideas include, but are not limited to, simple algebra, proportionality, scaling, and working with powers of 10. **DO NOT PANIC** if it's been awhile since you've seen these mathematical terms! We will develop them as we go through the course.

As we strive to achieve these course goals, we will achieve a number of the more basic goals of the general education curriculum at West Chester University, including the:

1. Ability to communicate effectively;
2. Ability to employ quantitative concepts and mathematical methods;
3. Ability to think critically and analytically.

**Grading:** Attendance: 5%  
Wrap-Up Activities: 15%  
Homework: 15%  
Exams: 45%  
Cumulative Final Exam: 20%

**Attendance:** You are expected to attend all scheduled classes for the entire scheduled time. Half-credit will be awarded for late attendance, or for leaving class early. I do understand that on occasion something unforeseen will pop up and prevent you from attending class; therefore, I will grant you up to five (5) unexcused absences (no questions asked, no note needed) this term. Any additional unexcused absences will result in **zero** attendance credit for that date. Excused absences are limited to University-Sanctioned Events (which follow the Excused Absence Policy for University-Sanctioned Events as described in the West Chester University Undergraduate Catalog), and absences due to serious illness or injury, or the death of family members (each of which is to be verified in writing by a practicing, non-related, physician). In cases of extreme illness or emergency that will require prolonged absence, *you are responsible* for contacting Dean Bricketto (Student Affairs). His office will contact your professors and make appropriate recommendations. If you are absent, whether excused or unexcused, ***it is your responsibility*** to get the notes you missed from a classmate, **including** notes on any mathematical problems we worked on in class, and to learn of any important announcements that were made in class.

**Homework:** All homework will be posted and submitted online on the course's D2L page. **Homeworks will be posted at 8PM on Sundays.** This will be true of all homework assignments this term. Generally speaking, homeworks will be due at 8PM on the Sunday following their posting. There will be three exceptions to this pattern during the term: once for the week of spring break, once for Easter, and once for the final week of classes. **YOU ARE RESPONSIBLE FOR CHECKING D2L AND KEEPING UP WITH ASSIGNMENTS**; this means checking to see that an assignment has been posted, knowing when it is due, and ensuring that it is completed before the deadline. To help you with this, I have included a column in the class schedule at the

end of this syllabus that tells you **BY WEEK** what homeworks will be posted and when they will be due. Life can get very busy during a semester, so it can be hard to remember to log in to do homeworks even when you know when they are being posted. Thus, you may wish to set up a periodic reminder to check in on our course's D2L site. Writing it in a daily or weekly planner may also help. **I will not always remind you in class about homeworks!** It is **YOUR RESPONSIBILITY** to remember to do them.

You may re-do a homework as often as you like before it is due; I will keep only the highest score of the attempts you made for my gradebook. But regardless of how many times you attempt one, **homeworks are due on the due date indicated on D2L, at the time listed on D2L**. No homework will be accepted late, **no exceptions**. Homework solutions will be posted shortly after the homework's due time. At the end of the semester, I will drop your lowest homework grade. This way, it's not a big deal if you miss one assignment. But if not doing homework becomes a habit, your grade **will** suffer quite a bit come the end of the semester. If you have a question or a computer problem, you must notify me at least 48 hours before the homework due date. Plan on your internet access and/or computer failing at the *worst possible time*, so have a go at the homework at some point before the day it is due. Report any problems with D2L ASAP by calling 1-877-730-6235 or visiting the ACC help desk in Anderson 20 (610-436-3350).

I encourage you to discuss the homework problems with each other, but **the work you do on homeworks must be your own**. (See the Academic Integrity statement on page 5 of this syllabus.) I also encourage you to discuss and review course material with your classmates. But be sure to study and think about the material on your own, because your classmates cannot help you on exams.

Please note that problems with technology can be unexpected, and for this reason I reserve the right to change details about how online assessments are conducted. You will be notified of any such changes both in class and in writing (through D2L and email).

**Wrap-Up Activities:** At the end of each lecture, we will complete a wrap-up activity. I'm not doing this to stress you out, or to make you feel like you're being quizzed every single time you come to class. Rather, these activities are designed to get you thinking more about what we went over that day in class, and to let you get your hands and brains around some of the new terms, concepts, and equations we discussed while they are still fresh in your mind. All wrap-ups will be open book, and will consist of four multiple choice questions. I will base them partly on the assigned readings for that class, and partly on the lecture we just completed. You will complete wrap-ups in groups of two or three, and will have about 5 minutes to do them. After I collect wrap-ups, **there will be no further opportunity to do them**. I will drop your lowest four (4) wrap-up activities, so if you need to bug out of class early a couple of times it won't hurt your grade.

Wrap-ups will be worth 5 points. You will get 1 point just for turning the activity in, and each correctly answered question will be worth 1 point. Wrap-ups will **NOT** be given on test days. During weeks where 3 wrap-up activities are scheduled to be done, I will grade only 2 of the 3 of them; the 2 to be graded will be chosen at random. This way, they won't always count, so if you have a bad day it's less likely to impact your grade. Keep in mind that I intend wrap-up activity points to be easy for you to accumulate, so give them your best go!

**Exams:** There will be four in-class exams given over the course of the semester. The dates of these exams are:

<b>February 20</b> <b>March 19</b> <b>April 4</b> <b>April 23</b>
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The range of chapters each exam covers is given in the course schedule, which can be found at the end of this syllabus. If the course schedule is adjusted from what appears at the end of this document, it will be posted to D2L and there will be an announcement made in class. **PLEASE** pay attention to all in-class announcements to make sure you know what chapters the exam will be on, and check D2L regularly to make sure you have an up-to-date course schedule. **You** will be responsible for knowing what chapters will be covered on an exam, and when it is.

**YOUR LOWEST EXAM GRADE WILL BE DROPPED.** Thus only your three (3) highest test grades will be counted. Each of these three exams will count 15% toward your final grade, so a total of 45% of your final grade depends on your performance on exams. **THERE WILL BE NO MAKE-UP EXAMS GIVEN.** If you miss an exam, it will count as your dropped one. Only under very special circumstances will there be any change to this policy, and in those cases, exceptions will be made **ONLY** when I am notified prior to the scheduled exam time of a conflict.

Tests will consist of multiple choice questions and 1 open-ended problem, which I will design to be similar to example and practice problems done in class. A constant curve will be applied to an exam if the class average drops below 75% to increase it to this value. The scope of each test (with the exception of the final) is limited to the chapters listed in the class schedule at the end of this syllabus; however, even though earlier material is not explicitly tested it may still appear on an exam. You have been warned!

Tests will be closed book, but you will be permitted to use one 8.5 x 11" sheet of paper (front only!) with your own, handwritten notes. I reserve the right to refuse the use of typed sheets, or sheets which contain information on the front and back, during an exam. Also, you are permitted to use calculators during exams, but **ONLY** a calculator that is **not** part of an iPod/iPad, cell phone, etc. If I catch you using an iPod/iPad, cell phone, Kindle, etc. as a calculator during an exam, I will take your exam and you will get a zero on it. No exceptions. I will NOT bring extra calculators for you to use during exams. It is **YOUR RESPONSIBILITY** to make sure you have a stand-alone calculator for an exam if you want to use one.

You will get graded exams back, but you are not allowed to keep them; you **will**, however, get to keep a sheet of paper that tells you your exam grade, and how you did on the multiple choice portion of the exam. I will hold graded exams in my office after you have seen them; you can make an appointment any time you like to come look at an exam.

**Final Exam:** The final exam for this course will be given on Monday, May 7 from 1:00 PM–3:00 PM. This is the time scheduled by the University registrar for our final exam. The final **will be cumulative**, and **it is mandatory**.

**Extra Credit:** I am offering **one** extra credit opportunity this semester. It is entirely optional; you are not required to do it. It will involve keeping track of observations of physics in action during the course of your daily routine, over the course of the semester. Details of the project will be provided during the first class period. If you want to do the extra credit project, you **MUST** tell me so by email by February 3 at 5PM. I will NOT accept extra credit projects which were not announced to me by email by February 3. Projects will be due on May 4 at the start of class. Successful completion of this extra credit project will raise your lowest kept homework score to a 15/15.

**Teaching Style:** I will be using MS PowerPoint slides a great deal when going over course material in class; occasionally, I will be making use of the chalk board to work through a problem. I will try to write big enough so that everyone can see, but if you do have trouble seeing what I write please move to the front of the room. I will post modified copies of the MS PowerPoint slides I use in class online on our course's D2L page before each lecture. I do so to provide you with a *supplement* to the notes you are already taking in class. The slides I put up on D2L are **NOT** meant to take the place of your own personal note-taking. **YOU** will be responsible for that. The purpose of providing you with modified copies of the slides used in class is to give you the text for all in-class activities we will do, so that you do not need to worry about copying down those words and can instead concentrate on thinking about said activities. I also try to leave plenty of room for you to write down key equations, words, and other ideas so that you'll remember these things later. Please note carefully that these modified slides will NOT contain the solutions to the example problems I do in class. If you want notes on those, you'll need to take them as I solve the problem on the board in class. I will do my best to engage you interactively with the material during class time. Activities may include, but are not limited to, conceptual questions to be discussed with a neighbour, tutorial activities, practice quantitative problems, and interactive demonstrations. I hope these activities both enhance your learning and help make class a little more exciting for you.

**Intellectual Property Statement:** The instructor for this course utilizes copyrighted materials under the "Freedom and Innovation Revitalizing United States Entrepreneurship Act of 2007" (Fair Use Act). Apart from such copyrighted materials, all other intellectual property associated with this course is owned and copyright protected by the instructor, including, but not limited to, lectures, course discussions, course notes and supplementary materials posted or provided to students authored by the instructor, assessment instruments such as quizzes and exams, and Power Point presentations. No recording, copying, storage in a retrieval system, or dissemination in any form, whether electronic or other format, by any means of the intellectual property of the instructor, either in whole or in part, is permitted without the prior written permission of the instructor. When such permission is granted, it must specify the utilization of the intellectual property and all such permissions and waivers shall terminate on the last day of finals in the semester in which this course is held.

Links and references to on-line resources provided by the instructor may lead to other sites. The instructor does not sponsor, endorse or otherwise approve of any information appearing in those sites, nor is responsible for the availability of, or the content located on or through, external sites. Apart from materials used in accordance with the Fair Use Act, the instructor takes no responsibility for material that is otherwise offered at web sites and makes no warranty that such material does not infringe any third party rights. However, should any of this type of material be present and this fact is brought to the attention of the instructor, they will remove references to it from course materials.

**Ye Olde Technology Policy:** Please turn off all cell phones, iPods, iPhones, smart phones, BlackBerrys, etc. before class. If you are expecting an emergency call, change your phone to vibrate mode and answer the call outside of our classroom. You are not allowed to use cell phones for texting or gaming during class. Doing so is distracting to your classmates and instructor. If I catch you using your cell phone inappropriately during class, I will take 5 points off of the nearest exam grade! **NO EXCEPTIONS.** If you feel the temptation will be too great, be on the safe side and leave your cell phone stored in your bag. I do not allow the use of laptops in my class. However, I am willing to make an exception for those who bought an e-copy of the required textbook, provided that I see proof of the e-copy on your computer. Terms of laptop use in these cases can be discussed with me on an individual basis.

**Academic Integrity:** It is the responsibility of each student to adhere to the University's standards for academic integrity. Violations of academic integrity include any act that violates the rights of another student in academic work, that involves misrepresentation of your own work, or that disrupts the instruction of the course. Other violations include (but are not limited to): cheating on assignments or examinations; plagiarizing, which means copying any part of another's work and/or using ideas of another and presenting them as one's own without giving proper credit to the source; selling, purchasing, or exchanging of term papers; falsifying of information; and using your own work from one class to fulfill the assignment for another class without significant modification. Proof of academic misconduct can result in automatic failure and removal from this course.

For questions regarding Academic Dishonesty, the No-Grade Policy, Sexual Harassment, or the Student Code of Conduct, students are encouraged to refer to their major department's handbook, the Undergraduate Course Catalogue, the Rams Eye View, or the University Web Site. Please understand that improper conduct in any of these areas will not be tolerated and may result in immediate ejection from the class.

**Disability and Special Needs:** We at West Chester wish to make accommodations for persons with disabilities. Please make your needs known by contacting the Office of Services for Students with Disabilities at extension 3217 as well as myself. Sufficient notice is needed in order to make the accommodations possible. The University and I desire to comply with the ADA of 1990.

**Tutoring:** Tutoring for PHY 100 is offered by the Learning Assistance Resource Center (LARC), 223 Lawrence Center, x2535. See the following website for more information: <http://www.wcupa.edu/ussss/larc/>. LARC tutoring is free of charge, but you must sign up at the beginning of the semester. Physics majors MAY offer additional tutoring in PHY 100 during the semester. An announcement will be made in class if this is the case.

**Withdrawal Notice:** A syllabus constitutes a contract between student and instructor. Your continued enrollment after the **January 28 drop deadline** indicates that you accept all instructional practices, requirements, and policies. If you find the standards to which you will be held accountable too rigorous, if you are unable to *reliably* access the internet to log on to D2L, or if an ongoing scheduling conflict prevents you from attending class regularly and punctually, you must officially withdraw (grade “W”) through the Registrar’s Office by the **March 30 course withdrawal deadline**. You are responsible for checking your grades before this withdrawal deadline so you aren’t surprised by your standing as the end of the course approaches. You can contact me anytime to get an estimate of your grade as it stands at the moment.

**Public Safety:** All students are encouraged to sign up for the University’s free WCU ALERT service, which delivers official WCU emergency text messages directly to your cell phone. For more information and to sign up, visit [www.wcupa.edu/wcualert](http://www.wcupa.edu/wcualert). To report an emergency, call the Department of Public Safety at 610-436-3311.

**Study tips:**

- Keep up with the readings and do them before class!
- Don't blow off the homework! It's a good way to accumulate points, and good practice for exams.
- When reading, pay attention to the “Are You on the Bus?” problems. Don't skip them over! They provide a gauge of whether or not you've understood what you just read. If you have trouble with the “Are You on the Bus?” problems, you may have difficulties with problems on the test. Don't hesitate to get help from me, a classmate, or a tutor if this is the case!
- Also pay attention to the Flawed Reasoning problems. They point out common problems in conceptual understanding and reasoning, and can provide a good model for how to go about answering conceptual problems.
- Work along with the “Working it out” problems.
- Practice makes perfect! Before an exam, pick some of the problems from the end of the chapter questions and do them. Play “what-if” games with the concepts presented in class: What if I gave you two quantities and asked for a third? What's your plan for that? How about if one of those quantities gets bigger? If you have an action plan for these things in your head, you're less likely to freeze up and panic if you see them on a test.
- When you see a physical explanation for some phenomenon come up in the textbook, try asking yourself what would happen if something about it changed. For example, let's say that you were trying to toss a rock up in the air in order to watch the path it took. How would you expect the rock's path to change if you tossed it up at a shallow angle with respect to the ground? A steep one? What if it was a heavier rock? Thinking about these things gives you good practice in extending the physical theories we've learned to new situations, and could be helpful on exams.
- Please make use of my office hours, and don't hesitate to email me questions about the homework or to schedule a time to meet outside office hours.

## CLASS SCHEDULE

This is the tentative schedule; I will try to follow it as closely as possible. I will post any changes to this schedule to D2L, and announce in class that an updated schedule has been posted. **IT IS YOUR RESPONSIBILITY** to make sure that you have an up-to-date class schedule.

It is also **your responsibility** to read the assigned selections from the text before you arrive in class. I will not always cover in class everything that is contained in the readings.

Week	Class Meeting	Topic	Readings Due	Homework
1	January 23	Welcome, Course Intro, Math Review	–	None
	January 25	Building a World View / What is Physics / What “Counts” as Physics	Ch. 1: “First Grade,” “On Building a World View,” “Bode’s Law,” and “Measurements;” AND Ch. 11: “Building Models”	
	January 27	Measurement / Scales	Ch. 1: “Measurements,” “Sizes: Large and Small”	
2	January 30	Speed / Velocity / Acceleration	Ch. 2: “Average Speed,” “Images of Speed,” “Instantaneous Speed,” “Speed with Direction,” “Acceleration,” and “A First Look at Falling Objects.”	HW #1 posted
	February 1	Free Fall / Explaining Motion / Vectors	Ch. 2: “Free Fall: Making a Rule of Nature,” “Starting with an Initial Velocity,” and “A Subtle Point” AND Ch. 3: “An Early Explanation,” “The Beginnings of Our Modern Explanation,” and “Adding Vectors”	
	February 3	Newton's Laws / Mass vs. Weight	Ch. 3: “Adding Vectors,” “Newton’s First Law,” “Newton’s Second Law,” “Mass and Weight,” “Weight,” and “Free-Body Diagrams”	
3	February 6	Newton’s Laws / Using Newton's Laws	Ch. 3: “Free-Body Diagrams,” “Free Fall Revisited,” “Galileo vs. Aristotle,” “Friction,” and “Newton’s Third Law”	HW #1 Due HW #2 posted
	February 8	BUFFER CLASS	Chapter 3	
	February 10	Circular Motion	Ch. 4: “Circular Motion,” “Acceleration Revisited,” and “Acceleration in Circular Motion”	
4	February 13	Projectile Motion	Ch. 4: “Projectile Motion,” “Launching an Apple into Orbit,” and “Rotational Motion”	HW #2 Due HW #3 posted
	February 15	Newtonian Gravity	Ch. 5: “The Concept of Gravity,” “Newton’s Gravity,” “The Law of Universal Gravitation,” and “The Value of G”	
	February 17	Gravity Near Earth / Gravity Far From Earth	Ch. 5: “Gravity Near Earth’s Surface,” “Satellites,” “Tides,” and “How Far Does Gravity Reach?”	
5	<b>February 20</b>	<b>TEST #1</b>	<b>CHAPTERS 1–4</b>	HW #3 Due HW #4 posted

5	February 22	Momentum and its Conservation	Ch. 6: "Linear Momentum," "Changing an Object's Momentum," and "Conservation of Linear Momentum"	
	February 24	Collisions	Ch. 6: "Collisions," "Investigating Accidents," and "Airplanes, Balloons, and Rockets"	
6	February 27	What is Energy / Kinetic Energy / Work	Ch. 7: "What is Energy?" "Energy of Motion," "Conservation of Kinetic Energy," and "Changing Kinetic Energy"	HW #4 Due HW #5 posted
	February 29	Potential Energy / Conservation of Energy	Ch. 7: "Forces That Do No Work," Gravitational Energy," "Conservation of Mechanical Energy," and "Roller Coasters"	
	March 2	Other forms of energy / Conservation of Energy Redux / Power	Ch. 7: "Other Forms of Energy," "Is Conservation of Energy a Hoax?" and "Power"	
7	March 5	Rotational Motion and Torque	Ch. 8: "Rotational Motion," "Torque," and "Rotational Inertia"	HW #5 Due HW #6 posted
	March 7	Center of Mass / Stability / Extended Free-Body Diagrams	Ch. 8: "Center of Mass," "Stability," "Rotational Kinetic Energy"	
	March 9	BUFFER CLASS	CHAPTER 8	
8	March 12	Spring Break!	--	None! It's a break!
	March 14	Spring Break!	--	
	March 16	Spring Break!	--	
9	March 19	TEST #2	CHAPTERS 5–8	HW #7 posted
	March 21	Heat, Temperature, and Thermal Energy	Ch. 13: "The Nature of Heat," "Mechanical Work and Heat," "Temperature Revisited," "Heat, Temperature, and Internal Energy," and "Absolute Zero"	
	March 23	Heat Transfer	Ch. 13: "Conduction," "Convection," "Radiation," and "Wind Chill"	
10	March 26	Heat Engines / About Perpetual-Motion Machines	Ch. 14: "Heat Engines," "Ideal Heat Engines," "Perpetual-Motion Machines," and "Real Engines"	HW #7 Due; HW #8 posted
	March 28	Refrigerators / Entropy	Ch. 14: "Refrigerators," "Order and Disorder," "Entropy," "Decreasing Entropy," and "Energy and Our Energy Crisis"	
	March 30	Vibrations and Waves	Ch. 15: "Simple Vibrations," "The Pendulum," "Waves: Vibrations that Move," "One-Dimensional Waves, and "Superposition"	



11	April 2	Traveling Waves / Superposition of Waves	Ch. 15: "Superposition," "Periodic Waves," "Standing Waves," and "Resonance"	HW #8 Due; Practice Set
	<b>April 4</b>	<b>TEST #3</b>	<b>CHAPTERS 13–15</b>	
	April 6	Electrical Properties / Electric Charge	Ch. 20: "Electrical Properties," "Two Kinds of Charge," "Conservation of Charge," "Induced Attractions"	
12	April 9	The Electric Force	Ch. 20: "Induced Attractions," "The Electroscope," "The Electric Force," and "Electricity and Gravity"	HW #9 posted
	April 11	The Electric Force / Electric Potential	Ch. 20: "Electricity and Gravity," "The Electric Field," "Electric Field Lines," and "Electric Potential"	
	April 13	Electric Current	Ch. 21: "An Accidental Discovery," "Batteries," "Pathways," and "A Water Model"	
13	April 16	Resistance to Electric Current / The Electrical You	Ch. 21: "A Water Model," "Resistance," "The Danger of Electricity," and "A Model for Electric Current"	HW #9 Due; HW #10 posted
	April 18	Electric Current / The Electrical You / Electric Power	Ch. 21: "A Model for Electric Current," "A Model for Voltage," and "Electric Power"	
	April 20	BUFFER CLASS	CHAPTER 21	
14	<b>April 23</b>	<b>TEST #4</b>	<b>Chapters 20–21</b>	HW #10 Due; HW #11 posted
	April 25	Magnets / Electromagnetism	Ch. 22: "Magnets," "Electric Currents and Magnetism," "Making Magnets," and "The Ampere"	
	April 27	The Magnetic Earth / Particles in Magnetic Fields	Ch. 22: "The Magnetic Earth," "Charged Particles in Magnetic Fields," and "Magnetism and Electric Currents"	
15	April 30	Magnetism and Charged Particles / Transformers / Generators	Ch.22: "Magnetism and Electric Currents," "Transformers," and "Generators and Motors"	HW #11 Due; HW #12 posted
	May 2	Electricity and Magnetism / Electromagnetic Waves	Ch. 22: "Generators and Motors," "A Question of Symmetry," "Electromagnetic Waves," and "Radio and TV"	
	May 4	Course Review	All of it!	
xx	<b>May 7</b>	<b>FINAL EXAM</b>	<b>1:00 PM–3:00 PM</b>	