West Chester University

Physics 100-04: Elements of Physical Science
Spring 2014

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 itself a physical object that we use to go where we want and operate the machines and tools that we want. But what of things like cars, TVs, skateboards, and cell phones: do they operate and move according to the same set of "rules" which describe the motion of our bodies? 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.

In PHY 100, we will examine the application of modern physics to various aspects of our everyday lives. Our ultimate goal is to understand how scientific models of the physical world can enrich our understanding of everyday processes and interactions. We will begin by considering what a model of the physical world consists of, 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 and rotation which allow us to make sense of how and why things in the world around us move. Lastly, we will turn our attention to electricity and electric circuits 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 credit 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 drawing and interpreting diagrams, in addition to applying the physical theories we learn to new situations in order to understand them. I will assume that you have some experience doing these things, but haven't practiced with them in a while.

Meeting Times: Monday, Wednesday, Friday from 1:00PM 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, 2009 or 2010)
- A stand-alone calculator which is ***not*** part of a cell phone or other internet-accessible personal electronic device
- A Turning Technologies ResponseCard RF LCD clicker

Instructor Information:

Dr. Michelle A. Caler
office: Merion Science Center room 135
office hours: Tuesdays and Thursdays from 1:00PM—3:00PM
Wednesdays and Fridays from 3:00—4:00PM
… and by appointment
email: mcaler@wcupa.edu
office phone: 610-436-2320
webpage: This course has a D2L webpage. Homeworks, this 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 website 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 for how ideas from the science of physics influence our everyday lives. One of the ways we will accomplish this goal is by building up an understanding of how and why various physical phenomena occur, emphasizing those processes and interactions which we encounter regularly. Over the course of our studies, we will develop a qualitative understanding of our current physical model of the natural world; additionally, we will learn how to make quantitative predictions using the mathematical laws which form its foundation. In particular, we will examine modern physical theories of linear motion, rotational motion, momentum, energy, and electricity. While I hope that you will gain a greater understanding of these topics and how they explain physical phenomena that we see every day, our larger goal in studying them is to illustrate how the methods and ideas of science inform our understanding of the natural world.

As we work toward meeting 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 reasoning 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 the above 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: Class participation: 15%
Homework: 20%
Exams: 45%
Cumulative Final Exam: 20%

Class Participation and Attendance: Class participation will be recorded using the Turning Technologies ResponseCard RF LCD clicker system. I am ***requiring*** that you buy a ResponseCard RF LCD and register it. Please purchase and register your ResponseCard by **Friday January 31st at noon**. Make sure that you bring it to every class, and that you check its battery life periodically. I will have **ONE** spare ResponseCard that you can borrow in case you forget yours: first come, first served. You get **two** borrows per semester, and you must return my ResponseCard when class is over. If my spare ResponseCard walks away, there will be **NO** emergency borrowing opportunities for *anyone* for the rest of the semester.

Each day of class (test days not included) will be worth 3 points of class participation credit. Class participation points will be earned by responding with your ResponseCard to questions that I ask during my PowerPoint presentations. These questions will consist of (but are not necessarily limited to) "Voting Opportunities" and "YouPredict Opportunities." I reserve the right to introduce ways in addition to these to earn class participation credit. To earn full class participation credit for a class period, you need to respond using your ResponseCard to ***ALL*** response questions asked in class, even times when I ask you to respond again after talking to a neighbour. Partial class participation credit will be awarded only under special circumstances, and at my discretion. You ***DO NOT*** have to answer response questions *correctly* in order to get full credit: you just have to attempt them. It is in your best interest to do your best to get the correct answer, though, so don't just randomly hit buttons when the questions come up. Give them your best go.

You ***MUST*** be present in class responding with your ResponseCard in order to receive class participation credit. Thus, I am expecting you to attend all scheduled classes for the entire scheduled time. I do understand that on occasion something unforeseen will pop up and prevent you from attending class; therefore, at the end of the term I will drop five (5) days of class participation points. Any additional unexcused absences will result in ZERO class participation points for those dates. If you miss class due to

an excused absence, it is ***IT IS YOUR RESPONSIBILITY*** to contact me by email to arrange a way to make up the class participation points that you missed. 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 order to earn class participation points with your ResponseCard, ***YOU*** must be the one entering responses with it. I have a zero tolerance policy for ANYONE who hands their ResponseCard to a classmate and tells that classmate to use it in class for them. You will earn **ZERO** class participation points for days when your ResponseCard was present but you were not. I reserve the right to introduce alternate forms of attendance taking to enforce this. If I catch you with more than one ResponseCard because you have someone else's to respond with, ***you*** will earn **ZERO** class participation points for that day.

As with any technology, problems with the ResponseCard system can pop up unexpectedly. For this reason—and in the event that other unforeseen circumstances arise—I reserve the right to change details about how class participation credit is awarded on a particular day as circumstances warrant it. You will be notified of any such changes both in class and on D2L. I also reserve the right to increase the number of dropped days of class participation due to unforeseen circumstances.

Homework: All homework will be posted and submitted online through the "homework" section of this course's D2L webpage. There will be ten (10) homeworks—one for each chapter covered—assigned over the course of this semester. ***YOU ARE RESPONSIBLE FOR CHECKING D2L AND KEEPING UP WITH HOMEWORKS***; 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 **WEEK BY WEEK** what homeworks will be posted, when they will be posted (date/time), and when they will be due (date/time). 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. 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 pre-timed reminders to check in on our course's D2L site. **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 your highest score for my gradebook. But regardless of how many times you attempt one, **homeworks are due on the due date and time indicated on the class schedule and D2L**. No late homeworks will be accepted, ***no exceptions***. This is because 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 1-877-325-7778 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 6 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.

As with any technology, problems with online D2L assessments can pop up unexpectedly, and for this reason I reserve the right to change details about how they are conducted. I also reserve the right to modify homework due dates and times due to unforeseen circumstances. You will be notified of any such changes both in class and on D2L.

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

February 17
March 14
April 11
May 2

The range of chapters each exam covers is given in the class schedule, which can be found at the end of this syllabus. If the class 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. Make sure to check D2L regularly to ensure that you have an up-to-date class 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. ***THERE WILL BE NO MAKE-UP EXAMS GIVEN***. If you miss an exam, you will receive a zero for it, and it will be used as your dropped exam. 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 at least 24 hours prior to the scheduled exam time of a conflict. If you have ANY questions or concerns about this particular point, please come talk to me and get clarification BEFORE it is too late!

Tests will consist of approximately 10—20 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; 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* and *closed notebook*. However, I will give you one sheet of equations to use during the exam. This equations sheet will be **the only aid** allowed to you during exams, with the exception of a stand-alone calculator (as described below). All other written and electronic aids are **strictly forbidden**. I will post to D2L the equations sheet that I will give you for an exam at least 24 hours before the exam time, so that you can see what will be on the sheet. You are permitted to use a stand-alone calculator (i.e., one that is ***not*** part of an iPod/iPad, cell phone, tablet PC, Kindle, etc.) during exams. If I catch you using an internet-accessible personal electronic device as a calculator during an exam, I will take your exam and you will get a zero on it. No exceptions. If you will be using a graphing calculator, I must personally see you clear its memory before you receive your exam. I will NOT bring extra calculators for you to use during exams. It is ***YOUR RESPONSIBILITY*** to make sure you have a working stand-alone calculator for exams.

After each exam, I will return to you the answer sheet which contains your solution to the open-ended question and your responses to the multiple choice questions. I will write your exam grade on the top of this sheet. I will hold the copies of the multiple choice exam questions in my office after you have seen them; you can make an appointment any time you like to come look at the multiple choice exam questions.

Final Exam: The final exam for this course will be given on Wednesday, May 7th from 1:00PM—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.*** It will consist of approximately 35—45 multiple choice questions and 1 open-ended question. Missing the final exam will result in a zero for the exam unless EXTREME circumstances apply. Your final exam grade ***cannot*** be counted as your dropped exam score.

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 making observations of physical theories at work in your day-to-day life 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 **Friday January 31st at 5PM**. I will NOT accept extra credit projects which were not announced to me by email by January 31st. Projects will be due on May 5th at the start of class. Successful completion of this extra credit project will boost your overall course grade by one percentage point.

Teaching Style: I will be using MS PowerPoint slides a great deal when going over course material in class; when example problems come up, I will use the chalk board to work through them. 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. Before the class period on which we will begin covering a chapter, I will post to our class's D2L webpage **modified copies** of the MS PowerPoint slides I will use in class, in the so-called "structured note-taking" style. 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. I provide these modified slide copies to give you the text for in-class activities we will do, so that you do not need to worry about copying down their text and can instead concentrate on thinking about them. I will also leave plenty of room for you to write down key equations, words, and other ideas so that you'll remember them later. Please note carefully that these modified slides will NOT contain solutions to example problems done in class, nor will they contain each and every word seen on the in-class slides. If you want notes on these things, you'll need to take them for yourself as we go through the material 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, tutorial activities, "Voting Opportunities," "YouPredict Opportunities," "Rank my *x*" problems, practice problems, and interactive lecture demonstrations. As mentioned above, your responses to some of these items will count as class participation credit. I hope that 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/iPads/iPhones, tablet PCs, Kindles, laptops, 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 a personal electronic device 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 device 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 textbook, provided that I see proof of the e-copy on your computer or tablet. I do understand that use of a laptop, or other personal electronic devices, may be required to accommodate certain disabilities. Terms of use in both of 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 x3217 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. For more information, see 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 26th 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 28th 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. To report an emergency, call the Department of Public Safety at 610-436-3311.

Study tips:

- Look at the learning objectives to see what I expect you to know and know how to do by the end of each unit and each chapter. Learning objectives for all units and chapters will be posted to the "course materials" section of D2L.
- Keep up with the readings and do them before class! Physics makes more sense if the exposure you get to an idea in class is your second time seeing it.
- When reading, pay attention to the "Are You on the Bus?" questions and the "Flawed Reasoning" problems.
- Check on D2L to see if I've posted any practice problems before tests or to go with the readings.
- 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 of 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	Homework	Class Meeting	Topic	Readings Due
1	Practice HW posted ON D2L at 8AM on January 22	January 22	Welcome, Course Intro	--
		January 24	Building a World View / What is Physics / What "Counts" as Physics	Ch. 1: "First Grade," "On Building a World View," AND Ch. 11: "Building Models"
2	Practice HW DUE on January 28 at 10PM	January 27	Measurement / Scales	Ch. 1: "Bode's Law," "Measurements;" and "Sizes: Large and Small"
	HW#1 posted ON D2L at 8AM on January 29	January 29	Scales / Speed	Ch. 1: "Sizes: Large and Small;" Ch. 2: "Average Speed," and "Images of Speed"
		January 31	Speed / Velocity / Acceleration	Ch. 2: "Images of Speed," "Instantaneous Speed," "Speed with Direction" and "Acceleration"
3	HW#1 DUE on February 4 at 10PM	February 3	the Kinematic Equations of Motion / Free-Fall	Ch. 2: "Acceleration, "A First Look at Falling Objects," and "Free Fall: Making a Rule of Nature"
	HW#2 posted ON D2L at 8AM on February 5	February 5	Free-Fall / Adding Vectors	Ch. 2: "Free Fall: Making a Rule of Nature," "Starting with an Initial Velocity," "A Subtle Point," AND Ch. 3: "Adding Vectors"
		February 7	Forces and Vectors / Tour de Force	Ch. 3: "An Early Explanation," "The Beginnings of Our Modern Explanation," "Weight," and "Friction"
4	HW#2 DUE on February 11 at 10PM	February 10	Forces / Newton's Laws / Mass vs. Weight	Ch. 3: "Newton's First Law," "Newton's Second Law," and "Mass and Weight"
	HW#3 posted ON D2L at 8AM on February 11	February 12	Newton's Laws / Free-Body Diagrams	Ch. 3: "Mass and Weight," "Newton's Third Law," and "Free-Body Diagrams"
		February 14	Review for Exam I	Readings from Jan. 24 thru Feb. 12
5	HW#3 DUE on February 16 at 10PM	***February 17***	***EXAM I***	***CHAPTERS 1—3***

5		February 19	Uniform Circular Motion	Ch. 4: “Circular Motion,” “Acceleration Revisited,” and “Acceleration in Circular Motion”
		February 21	Uniform Circular Motion / Projectile Motion	Ch. 4: “Acceleration in Circular Motion” and “Projectile Motion”
6	HW#4 posted ON D2L at 8AM on February 26	February 24	Projectile Motion	Ch. 4: “Projectile Motion” and “Launching an Apple into Orbit”
		February 26	Projectile Motion / Newton’s Gravity	Ch. 4: “Launching an Apple into Orbit” and Ch. 5: “The Concept of Gravity”
		February 28	Newton’s Gravity	Ch. 5: “The Concept of Gravity,” “Newton’s Gravity,” and “The Law of Universal Gravitation”
7	HW#4 DUE on March 4 at 10PM	March 3	Newton’s Gravity / Gravitational Fields / Tides	Ch. 5: “The Law of Universal Gravitation,” “The Value of G,” “The Field Concept,” “and “Tides”
	HW#5 posted ON D2L at 8AM on March 4	March 5	Momentum / Impulse	Ch. 6: “Linear Momentum” and “Changing an Object’s Momentum”
	HW#6 posted ON D2L at 8AM on March 8	March 7	Impulse / Systems	Ch. 6: “Changing an Object’s Momentum” and “Conservation of Linear Momentum”
8	HW#5 DUE on March 10 at 10PM	March 10	Systems / the Law of Conservation of Linear Momentum / Collisions	Ch. 6: “Conservation of Linear Momentum” and “Collisions”
	HW#6 DUE on March 13 at 10PM	March 12	Review for Exam II	Readings from Feb. 19 thru Mar. 10
		March 14	***EXAM II***	***CHAPTERS 4—6***
xx		March 17	Spring Break! ☺	None! Have some fun!
		March 19	Spring Break! ☺	None! Have some fun!
		March 21	Spring Break! ☺	None! Have some fun!
9		March 24	What is Energy / Kinetic Energy	Ch. 7: “What is Energy?” and “Energy of Motion”
		March 26	Work / Gravitational Potential Energy	Ch. 7: “Changing Kinetic Energy,” Forces That Do No Work” and “Gravitational Potential Energy”

9		March 28	Gravitational Potential Energy / The Law of Conservation of Mechanical Energy	Ch. 7: “Gravitational Potential Energy” and “Conservation of Mechanical Energy”
10	HW#7 posted ON D2L at 8AM on March 31	March 31	The Law of Conservation of Mechanical Energy / Power	Ch. 7: “Conservation of Mechanical Energy” and “Power”
	HW#8 posted ON D2L at 8AM on April 5	April 2	Power / Rotational Motion / Torque	Ch. 7: “Power” AND Ch. 8: “Rotational Motion,” “Torque”
		April 4	Torque / Extended Free-Body Diagrams / Static Equilibrium	Ch. 8: “Torque,” “Center of Mass,” and “Extended Free-Body Diagrams”
11	HW#7 DUE on April 6 at 10PM	April 7	Extended Free-Body Diagrams / Static Equilibrium	Ch. 8: “Extended Free-Body Diagrams”
		April 9	Review for Exam	Readings from Mar. 24 thru Apr. 7
	HW#8 DUE on April 10 at 10PM	***April 11***	***EXAM III***	***CHAPTERS 7 & 8***
12		April 14	Electrical Properties / Electric Charge	Ch. 20: “Electrical Properties,” “Two Kinds of Charge,” “Conservation of Charge,” and “Induced Attractions”
		April 16	Electric Charge / the Electric Force	Ch. 20: “Induced Attractions,” “The Electroscope,” and “The Electric Force”
		April 18	Electricity and Gravity / The Electric Field	Ch. 20: “Electricity and Gravity,” “The Electric Field” and “Electric Field Lines”
13	HW#9 posted ON D2L at 8AM on April 21	April 21	The Electric Field / Electric Potential	Ch. 20: “Electric Field Lines” and “Electric Potential”
	HW#10 posted ON D2L at 8AM on April 26	April 23	Electric Current / Complete Circuits / Batteries	Ch. 21: “Batteries,” “A Water Model,” and “Pathways”
		April 25	Complete Circuits / Electric Resistance	Ch. 21: “Pathways” and “Resistance”
14	HW#9 DUE on April 27 at 10PM	April 28	Electric Circuits	Ch. 21: “A Model for Electric Current” and “A Model for Voltage”
	HW#10 DUE on May 1 at 10PM	April 30	Electric Circuits / Electric Power	Ch. 21: “A Model for Electric Current,” “A Model for Voltage,” and “Electric Power”
		May 2	***EXAM IV***	***CHAPTERS 20—21***
15		May 5	Review for Final Exam	Readings from Jan. 22 through Apr. 30
		May 7	***FINAL EXAM***	***1:00PM—3:00 PM***