West Chester University

PHY 105-02: Structure of the Universe
Fall 2015

Course Overview: Our ultimate goal in PHY 105 is to develop insight into how the science of physics can be applied to the study of planets, stars, galaxies, and the universe as a whole. We will begin our studies by examining our place in the universe and how the motions of stars and other celestial bodies appear to us as observers on Earth. From there, we will study the modern physical theories of motion, light, and matter which help us make sense of the universe we live in. The rest of the course applies these physical theories to the study of our universe and its contents. During the second half of the semester, we shall see how our observations of the cosmos provide tests of these theories; we will also see how those observations can indicate a need for new hypotheses and ideas. At appropriate times, we will discuss the history of our current physical model of the universe as well as the scientists who developed it. Throughout our course, we will develop and build analytical reasoning and problem solving skills which are widely applicable to modern life.

Course Credit: This 3 credit course is an approved course in the WCU General Education program.

Course Requirements: This course has no prerequisites. However, we will be doing 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 reading and interpreting graphs, which I will assume you have some experience doing (but may not have practiced in a while). A good deal of time in this class will be spent extending our existing body of knowledge to new situations in order to understand them; I will assume that you have experience doing this.

Meeting Times: Tuesdays and Thursdays from 12:30 PM to 1:45 PM
Merion Science Center, room 112

Required Course Materials:

- *The Essential Cosmic Perspective, 6th Ed*., by Bennett, Donahue, Schneider, and Voit.
- 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: 135 Merion Science Center
office hours: Mondays and Wednesdays from 1:00PM—3:00PM
Thursdays from 10:00 AM to 11:00 AM, and from 2:00PM—3:00PM
… 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: My aim for PHY 105 is that, by the end of the course, you will have developed insight into how the science of physics can be applied to the study of planets, stars, galaxies, and the universe as a whole. Over the course of this semester, we will survey a wide variety of objects and phenomena, from the very smallest scales to the largest in the cosmos. While I hope you will gain an appreciation of these celestial bodies and related phenomena for the beautiful things that they are, our larger goal in studying them is to illustrate how the methods and ideas of science inform our understanding of objects and processes that we observe in our universe, as well as the universe itself. In addition, we will engage in a historical consideration of the development of our current theories of the physical world, to help you see how the methods of science have worked to produce the ideas we use today.

More specific course goals for PHY 105 include:

- gain an understanding of and appreciation for the nature of science
- develop an appreciation for how the process of science has led to physical theories which aim to explain the contents and evolution of our universe
- know several different ways to represent the information contained in quantitative word problems, and use those representations to successfully arrive at a solution
- be able to engage in proportional reasoning to arrive at a quantity or predict the outcome of a "what-if" scenario

Cooperative in-class activities such as "Voting Opportunities," interactive lecture demonstrations, tutorial activities, discussion questions, and interactive problem solving sessions (as detailed on page 5 of this syllabus), as well as assigned homework problems, will contribute to students' achievement of the above Course Goals.

As we work to achieve our course goals, I will be emphasizing the ability to reason with and work with concepts and equations rather than lots of strict fact memorization or complicated mathematics. (We will need to memorize some things, 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.

Course General Education Goals: PHY 105 is an approved General Education course in the Sciences. Throughout this course, we will engage in a number of in-class activities designed to help you meet the following General Education goals at West Chester University: (2) employ quantitative concepts and mathematical methods and (3) think critically and analytically. In-class activities include (but are not necessarily limited to) "Voting Opportunities," interactive lecture demonstrations, tutorial activities, discussion questions, and interactive problem solving sessions (as detailed on page 5 of this syllabus). The above-listed cooperative in-class activities, in addition to assigned homework problems, will contribute to students' achievement of the General Education Goals.

Grading: Class participation: 15%
Homework: 15%
Exams: 50%
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 physical ResponseCard RF LCD clicker (**NOT** the cell phone app) and register it. Please purchase and register your ResponseCard by **Tuesday September 8th at 12:00 noon**. Make sure that you bring your clicker to every class, and that you occasionally check its battery life.

Each day of class (test days not included) will be worth 5 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 participation 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 a button when a question comes up. Give questions 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 three 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). If you are absent from class, whether excused or unexcused, ***IT IS YOUR RESPONSIBILITY*** to get the notes you missed from a classmate—**including** notes on any quantitative problems worked in class—and to learn of any important announcements that were made.

In order to earn class participation credit 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. If I catch ***ANYONE*** using multiple ResponseCards during a class, this will be construed as cheating, and ***ALL*** involved parties will lose ***ALL*** class participation points for the semester. I reserve the right to introduce alternate forms of attendance taking to enforce this policy.

As with any technology, problems with the ResponseCard system can pop up unexpectedly. Thus, in the event that 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 in the event of unforeseen circumstances.

Homework: All homework assignments will be posted and submitted online through the "homework" section of this course's D2L webpage. There will be ten homeworks assigned over the course of this semester. ***YOU ARE RESPONSIBLE FOR CHECKING D2L AND KEEPING UP WITH HOMEWORK ASSIGNMENTS***; this means checking to see that a homework has been posted, knowing when the homework 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 in the class schedule and on D2L**. No late homeworks will be accepted, ***no exceptions***. This is because homework solutions will be posted shortly after a 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 come the end of the semester.

If you have a question or a computer problem, you must notify me at least 24 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 D2L help desk in Anderson Hall Room 2 (610-436-3350, option 1).
I encourage you to discuss homework questions 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 D2L online 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 in the event of 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:

September 15
October 13
November 10
December 3

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. 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 that exam is.
YOUR LOWEST EXAM GRADE WILL BE DROPPED. Only your 3 highest exam grades will be counted. ***THERE WILL BE NO MAKE-UP EXAMS GIVEN***. You **CANNOT** take an exam early or late. If you miss an exam, you will receive a zero for it, and it will be used as your dropped exam. Exceptions will be made ONLY for absences due to University-Sanctioned Events as described in the West Chester University Undergraduate Catalog. 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 25—45 multiple choice questions. Some tests **MAY** contain one open-ended problem; any open-ended problem appearing on an exam will be designed 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* 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 1 stand-alone calculator (i.e., a calculator 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 responses to the multiple choice questions. If the exam asked an open-ended question, your response to that question will also be returned. I will write your overall exam grade at the top of the multiple choice answer 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 Tuesday, December 8th from 10:30AM—12:30PM. 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 30—50 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 the semester-long observation of a single astronomical object that is **NOT** Polaris. Details of the extra credit project will be provided during the first class period. If you want to do the extra credit project, you MUST submit an observing plan to me by email by September 4th at 5PM. No plans will be accepted after this date. Projects will be due on December 3rd at the start of class. Successful completion of an extra credit project will boost your overall course grade by one percentage point.

Teaching Style: I will be using Microsoft PowerPoint slides a great deal when going over course material in class; occasionally, I will make use of the white 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. Before the class period on which we will begin covering a chapter, I will post on D2L **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 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 the activities themselves. 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 the modified slides I post 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 necessarily limited to, conceptual questions to be discussed with a neighbour, tutorial activities, "Voting Opportunities," "YouPredict Opportunities," interactive problem solving sessions, and interactive lecture demonstrations. I hope these activities both enhance your learning and help make class a little more exciting for you. The cooperative in-class activities listed above, in addition to assigned homeworks and exams, are designed to contribute to your achievement of the general education goals and course goals that this class has been designed to meet.

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 PowerPoint 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 or tablet PCs/iPads 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 West Chester University Undergraduate Catalog, 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.

Title IX: West Chester University and its faculty are committed to assuring a safe and productive educational environment for all students. In order to meet this commitment and to comply with Title IX of the Education Amendments of 1972 and guidance from the Office for Civil Rights, the University requires faculty members to report incidents of sexual violence shared by students to the University's Title IX Coordinator, Ms. Lynn Klingensmith. The only exceptions to the faculty member's reporting obligation are when incidents of sexual violence are communicated by a student during a classroom discussion, in a writing assignment for a class, or as part of a University-approved research project. Faculty members are obligated to report sexual violence or any other abuse of a student who was, or is, a child (a person under 18 years of age) when the abuse allegedly occurred to the person designated in the University protection of minors policy. Information regarding the reporting of sexual violence and the resources that are available to victims of sexual violence is set forth at the webpage for the Office of Social Equity at http://www.wcupa.edu/_admin/social.equity/.

Disability and Special Needs: If you have a disability that requires accommodations under the Americans with Disabilities Act (ADA), please present your letter of accommodations and meet with me as soon as possible so that I can support your success in an informed manner. Accommodations cannot be granted retroactively. If you would like to know more about West Chester University's Services for Students with Disabilities (OSSD), please contact the OSSD which is located at 223 Lawrence Center. The OSSD hours of Operation are Monday – Friday 8:30 a.m. – 4:00 p.m. Their phone number is 610-436-2564, their fax number is 610-436-2600, and their email address is ossd@wcupa.edu. See the following website for more information: http://www.wcupa.edu/ussss/ossd/default.aspx.

Email Policy: It is expected that faculty, staff, and students activate and maintain regular access to University provided e-mail accounts. Official university communications, including those from your instructor, will be sent through your university e-mail account. You are responsible for accessing that mail to be sure to obtain official University communications. Failure to access will not exempt individuals from the responsibilities associated with this course.

Tutoring: Tutoring for many 100 level courses is offered by the Learning Assistance Resource Center (LARC), 224 Lawrence Center, phone number 610-436-2535. As of the current moment, PHY 105 is not one of those courses; however, the folks at LARC will work with you to try and find a tutor if you need one. 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 tutoring in PHY 105 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 **August 31st 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 **October 23rd 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. All in-class exams will be based on the chapter learning objectives; the final exam will be based on the unit learning objectives. 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!
- Don't blow off the homework! It's a good way to accumulate points, and good practice for exams.
- 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 equations concepts presented in class: What if I gave you two quantities and asked for a third? What's your plan for that? What would happen if the Solar Nebula had had an initial clockwise rotation instead of a counterclockwise one … what would we expect the orbits of the planets to be like? 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.
- 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.

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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	HW #1 posted on D2L at 8AM on August 25	August 25	Welcome, Course Intro, Meet the Universe	—
		August 27	Our Cosmic Address, Scales of stuff in the universe	Ch. 1
2	HW#1 DUE on September 2 at 10PM	September 1	Distance, velocity, & time, Finding your way in the night sky	Ch. 1, Ch. 2.1
	HW #2 posted on D2L at 8AM on September 2	September 3	Finding your way in the night sky, Seasons, the Moon	Ch. 2.1—2.3
3	HW#2 DUE on September 9 at 10PM	September 8	the Moon, the planets, Ancient Astronomy	Ch. 2.3—2.4, Ch. 3.1
	HW #3 posted on D2L at 8AM on September 9	September 10	the Copernican Revolution, What is Science	Ch. 3
4	HW#3 DUE on September 14 at 10PM	***September 15***	***TEST #1***	***Chapters 1—3***
	HW #4 posted on D2L at 8AM on September 17	September 17	Newton's Laws of Motion	Ch. 4.1—4.2
5		September 22	Angular Momentum and Energy	4.3
		September 24	Gravity: Nature's most attractive law	Ch. 4.4
6	HW#4 DUE on September 30 at 10PM	September 29	Light and Matter: What really matters	Ch. 5.1
	HW #5 posted on D2L at 8AM on September 30	October 1	Light gets excited	Ch. 5.2
7		October 6	FALL BREAK	—
		October 8	Telescopes: Giant "Eyes" on the Sky	Ch. 5.3
8	HW#5 DUE on October 12 at 10PM	***October 13***	***TEST #2***	***Chapters 4 & 5***

8	HW #6 posted on D2L at 8AM on October 15	October 15	The Origin & Making of the Solar System	Ch. 6.1—6.3
9		October 20	The making of the Solar System and the planets	Ch. 6.3—6.4, Ch. 7.1
		October 22	The planets in our Solar System	Ch. 7.1, Ch. 8.1, Ch. 8.2
10	HW#6 DUE on October 26 at 10PM	October 27	The Sun and why the Sun shines	Ch. 10.1—10.2
	HW #7 posted on D2L at 8AM on October 26	October 29	Balance mechanisms in the Sun	Ch. 10.1—10.2
11		November 3	Star Systems: how they're made and how to find them	Ch. 12.1*, Ch. 6.5
	HW #8 posted on D2L at 8AM on November 5	November 5	Star Properties	Ch. 11.1
12	HW#7 DUE on November 9 at 10PM	***November 10***	***TEST #3***	***Chapters 6, 7, 8, 10, 12.1***
		November 12	Star Properties and the Main Sequence	Ch. 11.1—11.2
13	HW#8 DUE on November 16 at 10PM	November 17	Star Properties and the Main Sequence	Ch. 11.2
	HW #9 posted on D2L at 8AM on November 16	November 19	Stellar Evolution	Ch. 12.2—12.3
14	HW#9 DUE on November 23 at 10PM	November 24	Galaxies: It's a zoo out there!	Ch. 15.1—15.2
	HW #10 posted on D2L at 8AM on November 23	November 26	THANKSGIVING BREAK	—
15		December 1	A brief history of the universe and the Big Bang	Ch. 17.1—17.3
	HW#10 DUE on December 2 at 10PM	***December 3***	***TEST #4***	***Chapters 11, 12, 15, 17***
		December 8	***FINAL EXAM***	***10:30 AM—12:30 PM***

*just read up to page 337 in Chapter 12.1