

PHYSICS 109

Instructor: Paul Anderson

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Web site: <http://www.wfu.edu/~anderson/astronomy/>

Office Hours: 11-12 on Tuesday and Thursday, or by appointment.

Text: *The Essential Cosmic perspective, Sixth Edition, by Bennett, Donahue, Schneider, and Voit.* You also need access to the Mastering Astronomy web site and the Starry Night College planetarium software.

Description: Physics 109 is an intensive introductory course in astronomy. Topics covered include the solar system, stars, galaxies and the universe as a whole. Elementary physics and mathematics are used to obtain both a qualitative and a quantitative understanding of astronomy.

Online Homework: To encourage you to keep up with the reading assignments online homework assignments will be given before many classes. **You must have finished the assignment one-half hour before class begins.** Failure to do so will result in a grade of zero for that assignment. You are allowed to use the textbook and your class notes to help you answer the questions and you may ask the instructor about the questions, **but you may not get help from any other person or source.** The homework assignments will be accessed through the web site at www.MasteringAstronomy.com. **You will need to register for this web site.** If you purchased a new copy of the text from the campus bookstore then this will be free. If you purchased a used copy then you can go online and pay for the registration.

Quizzes: Weekly quizzes will be given on Fridays during the last 10 to 15 minutes of class except on those Fridays when an exam is scheduled either for that day, the Wednesday before, or the Monday afterwards.

Exams: There will be three in-class exams during the semester and a comprehensive final exam. The in-class exams will be on **Friday February 14, Monday March 24, and Wednesday April 23.** The final exam will be on **Friday May 2 at 9am** and it will be **cumulative.** Calculators may not be used for the exams.

Grading: The online homework assignments count 10% towards your final grade with the lowest three scores dropped. The quizzes count 10% towards your final grade with the lowest two quiz scores dropped. Each in-class exam counts 15%. The final exam counts 15%. However if you get a numerical score on the final which is higher than your lowest in-class exam then the score on that exam will be replaced by a score consisting of 75% of the score on your final exam plus 25% of the score on the original exam. If the numerical score on your final exam is higher than your second-lowest in-class exam then the score on that exam will be replaced by a score consisting of 75% of the score on your final exam plus 25% of the score on the original exam. The lab counts 20% of your final grade. **However, if you receive a final lab grade which, out of a total of 20 points, is less than 12 points you will automatically fail the course.**

Labs: Labs will be held in Room 105, Olin Physical Laboratory. **All students must bring their laptop computers to every lab.** Failure to do so may result in you being sent home to get it.

Lab Manual: The lab manual is available online at the web site given above. **You must print out each of the possible labs that you will do before coming to lab.** If you fail to do so and need to print out a lab when you get there **a fee of \$5.00 will be charged.**

You cannot change your lab section without written permission from me. You may only attend the lab section that you are assigned to.

There will be some outdoor labs and when it is cold outside you should dress **much more warmly** for them than you normally would to travel to and from class. Hats and gloves are strongly recommended. The outdoor labs have priority over the indoor labs so **be prepared to go outside.**

You are expected to attend and complete all twelve of the labs. Your lowest lab grade will be dropped. You are further expected to complete and hand in the work for each lab at the end of that lab session. **If you finish the work at home and hand it in late you will get a zero for that lab.**

Absences: You will receive a grade of **zero** for any exam, quiz, homework assignment, or lab for which you do not have an excused absence. Further it is your responsibility to contact me immediately if you miss an exam. **If you miss an exam for some trivial reason such as oversleeping or your car won't start then you must, regardless of your schedule that day, take the exam on the day you missed it. Failure to do so will result in a grade of zero.** Further, if you do not make up the exam before it is gone over in class you will be required to take an oral exam as a make-up. If you miss a homework assignment or a lab because you forgot about it you should contact me immediately or your grade will be zero. Forgetting homework assignments or labs more than once will also result in grades of zero for those assignments or labs.

If you have an excused absence for a lab you must get written permission from me in order to make it up. The TA's do not have the authority to excuse absences! Further you must then go to a lab that is doing the same lab you missed and give the note to the TA. It is your responsibility to do so as soon as possible. **Failure to do so will result in a grade of zero for the lab you missed.**

Examples of **acceptable excuses** include illness, family or other emergency, and participation in certain school functions. Examples of **unacceptable excuses** include studying for an exam, dinner with a family member or a friend, **leaving early for Spring Break**, and **any fraternity or sorority function.** If you have already booked a plane ticket (or made some other arrangement) which requires you to leave early for spring break then you must tell me right away and show proof that this was done before the class began. If you book a ticket (or make some other arrangement) requiring you to leave early for spring break after the class begins then you will simply have to either make other arrangements or take a zero for the missed lab. Note that there will be no lab on the Thursday before the Good Friday Observance.

As soon as you know that you will miss an exam, quiz, or lab you should send me an email message or call 336-758-4992 and let me know what you are going to miss and why. Whenever possible the absence should be excused ahead of time. You may be requested to provide proof of illness, etc.

Tentative Schedule

Week	Date	Topics	Chapter
1	Wed. Jan. 15	Overview of Course	1
	Fri. Jan. 17	Motions of Celestial Objects	2
2	Wed. Jan. 22	Ancient astronomy	2, 3
	Fri. Jan. 24	Copernican revolution	3
3	Mon. Jan. 27	Physics of Motion	4
	Wed. Jan. 29	Energy and gravity	4
	Fri. Jan. 31	Basic properties of light	5
4	Mon. Feb. 3	Spectra	5
	Wed. Feb. 5	Properties of the solar system	6
	Fri. Feb. 7	Formation of the solar system	6
5	Mon. Feb. 10	Formation continued	6
	Wed. Feb. 12	Planets Outside of the Solar System	6
	Fri. Feb. 14	In-class Exam	
6	Mon. Feb. 17	Sun	10
	Wed. Feb. 19	Sun continued	10
	Fri. Feb. 21	Sun continued	10
7	Mon. Feb. 24	Observational properties of stars	11
	Wed. Feb. 26	Classifying stars	11
	Fri. Feb. 28	Lives of low mass stars	12
8	Mon. March 3	Lives of high mass stars	12
	Wed. March 5	Stellar corpses	13
	Fri. March 7	Black holes and gamma ray bursters	13
9	Mon. March 17	Milky Way Galaxy	14
	Wed. March 19	Milky Way Galaxy cont.	14
	Fri. March 21	Galaxies	15
10	Mon. March 24	In-class exam	
	Wed. March 26	Distances to galaxies	15
	Fri. March 28	Active galaxies	15
11	Mon. March 31	Dark matter	16
	Wed. April 2	Structure formation and fate of the universe	16
	Fri. April 4	Early universe	17
12	Mon. April 7	Earth	7
	Wed. April 9	Life on Earth	18
	Fri. April 11	Solar system debris and impacts	9
13	Mon. April 14	Moon and Mercury	7
	Wed. April 16	Venus	7
	Fri. April 18	Good Friday Observance	
14	Mon. April 21	Mars	7
	Wed. April 23	In-class exam	
	Fri. April 25	Jovian planets and rings	8
15	Mon. April 28	Moons of Jovian planets	8
	Wed. April 30	Life outside the solar system	18

Tips on How to Study For This Course

In this course there is a large amount of material that you are expected to assimilate. The two things that will help you the most are to **attend all of the classes** and **keep up with the reading**. It is usually difficult to understand everything in a science course the first time it is presented. Therefore it is important to be exposed to the material a number of times in different ways. When studying it is usually best to **avoid highlighting** parts of the text. This is because science texts tend to be very densely written and you will miss important information. Instead it is best to **take notes** on what you read. This slows you down and gives you a chance to ask yourself whether you really understand the material you are reading.

PROCEDURE IN CASE THE UNIVERSITY CLOSSES FOR AN EXTENDED PERIOD

If some type of disaster forces the closing of the University for a period of weeks or months then the following procedures should be used.

1. If both the students and the instructor have a regular internet connection and the online homework is available then the instructor will send regular reading and homework assignments to the students via email. In place of the labs the students will be assigned exercises from the Starry Night College Workbook that they downloaded. The instructor will also send the student exams through the regular mail that the student will take as instructed. The Starry Night College Workbook exercises and exams will be mailed back to the instructor.
2. If the instructor does not have regular internet access or if one or more of the students does not have regular internet access but both have access to the regular mail service then each student should send the instructor his or her mailing address. The instructor will then send reading assignments along with homework assignments and assigned exercises from the Starry Night College Workbook that the student downloaded. The instructor will also send the student exams through the regular mail that the student will take as instructed. All homework, Starry Night College Workbook exercises and exams will be mailed back to the instructor.
3. If the instructor does not have regular access either to the internet or regular mail or if one or more of the students is in this situation then each students should read all of the material in the textbook which has not been previously assigned. For each full chapter that has not been previously assigned students should write the answers to all of the review questions. These will contribute to their homework grade. Students should also work through the exercises in the Starry Night College Workbook that they downloaded. These will contribute to their lab grade. In place of the in-class exams students should take the "Quick Quiz" on a piece of paper, listing of course the question number and the chapter as well. This latter should be done without looking back at the material in the chapter and without using any notes on that material. This material should be mailed to the instructor when that is possible or else it can be held until the University opens again. The final exam will either be mailed to the students or they will be allowed to take it when the University opens again.

The instructor's mailing address is:

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