

Syllabus:

(Also see <http://eeeyore.astro.uiuc.edu/~lwl/classes/astro210/spring05/>)

Astronomy 210: General Astronomy

Instructor Info

Instructor:	Prof. Leslie Looney	Email:	lwl @ uiuc . edu
Office:	218 Astronomy	Phone:	244-3615
Office Hours:	MThF, 10:30 – 11:30 am; or by appointment		

Welcome to Astronomy!

You have chosen a great time to take this course. Astronomy is right now in a golden age, with an explosion of new images and data about the Solar System, the Galaxy, and indeed the whole Universe coming from many new ground-based and space-based telescopes. Our scientific view of the big picture—the nature of the physical universe—underwent a revolution in the 20th century, and further discoveries are on the horizon. In this course, we will get an understanding of the big astronomical picture through the development of a qualitative and quantitative understanding of the structure and evolution of the Universe. From the night sky to the earliest instants of the Big Bang, we will apply basic physical principles on grand scales to outline the major aspects of modern astrophysics, describe some of the fundamental mysteries that remain unsolved, and imply how the flood of new data will help to solve them. Indeed, we will find astrophysics to be a great symphony that interweaves all areas of classical and modern physics.

Course Goals

My goals for a graduate of this course are that they understand our current scientific view of the Universe, conceptualize the Universe, propose what the future may hold for the field, make informed decisions about science policies, and hold any “discovery” to a personal scientific standard of proof. To realize this goal, the student should develop a broad conceptual synthesis—to “get under the hood” of the Universe and see how the cosmic machinery works. This will require a mathematical description of the Universe; thus, the lectures and assignments will feature a strong quantitative component. Indeed, we will find that a quantitative analysis is often essential to address qualitative questions, the results of which can lead to revolutions in our view of the universe.

Course Requirements

Requirement	Percentage of Grade		Points
Class Participation Exercises (will drop 1 or 2)		7%	70
Homework Assignments (best 10 out of 11)	10 x 3% each	30%	300
Observing Reports (Night, Solar, and Stardials)	4 x 2% each	8%	80
One Hour Exams	2 x 15% each	30%	300
Final Exam		25%	250
Total		100%	1000

Grading

The following table shows the approximate grading scale in this course.

Grade	Approximate Range
A	90-100%
B	80-89%
C	70-79%
D	60-69%
F	< 60%

Final course grades will follow these guidelines. Plusses and minuses will be used.

The ranges are approximate in that I may have to adjust them if, for example, I give an exam that is a little too hard. In any case, I will not increase the minimum cutoffs for each letter grade.

Recommended Text

Introduction to Modern Astrophysics, Bradley W. Carroll & Dale A. Ostlie, Addison-Wesley, 1996.

This book has the advantage that it is well written and fairly accessibly, and manner covers all of astrophysics. Indeed, if you go on to take more astrophysics, (e.g., ASTR 404, 405, or 406) this book is often a text for those courses, so you can view this as an investment in your astrophysics future. Unfortunately, either new or used, this text is **very** expensive: my apologies. Information in the text may be used for homework assignments, so a copy has been placed on reserve in the Physics and Astronomy Library in Loomis. Also, this book is very large! You should not fear that you have to memorize its contents! The truth is that it is very difficult to find a good textbook for this course, and Carroll & Ostlie represents the best compromise I currently know of.

Required Text

Coming of Age in the Milky Way, by Timothy Ferris, Perennial, 2003

This book is a nice general overview of most of the important topics in this class. Some homework and exam questions will be based from this book. Besides, it is a fun read.

Class Participation

You are expected to attend lectures. I will cover material here that will not always be in the text, and the lecture material will be included on the exam. Class time is the most valuable for you if you come prepared, having done the reading and ready to actively engage the material. To encourage your engagement, the lectures will often be punctuated by opportunities for your feedback, in the form of asking questions, "voting" on the possible outcomes of observations or demonstrations, or brainstorming answers to open-ended questions. To reward your participation in these activities, you will occasionally be asked to write down and hand in your response.

These *participation surveys* are not "quizzes" in the usual sense, in that you are not required to get all answers right. Rather, to get full credit you simply must offer a *scientifically reasonable* response. The point of this is that the survey is always an opportunity to gain points as long as you are actively engaged, even if you are still a little confused. Indeed, the most difficult and potentially confusing subjects are precisely those that most require your participation!

Although the number of these is not set, often they come upon me in a whim, we will usually have 8-15 of these a semester and 1-3 of them are dropped. This *usually* means that you can miss 1-3 surveys without penalty.

Homework

There will be 11 homework assignments given throughout the course. These are meant to sharpen your thinking on the material covered in lecture, to develop physical intuition and quantitative skills, and to help prepare you for the exams. Homework is due at the beginning of class on almost every Friday. Check the schedule online for specifics (<http://eeeyore.astro.uiuc.edu/~lwl/classes/astro210/spring05/schedule.html>).

Homework counts for 30% of the final grade! Your best 10 homework grades will be counted. However, you are responsible for all of the material covered on all 11 homework assignments. Thus, it is to your advantage to do all 11 of the assignments, and hand them in on time.

Homework is due at the beginning of class or at the announced time, after which the answers will be made available. **No late homework will be accepted.**

Observing

Nighttime Observing

Evening observing sessions will be held for several weeks at the Campus Observatory. You are required to go to one session at any of the several dates that will be posted online (<http://www.astro.uiuc.edu/classes/obs.shtml>). At the session there will be 4 stations that you can visit in any order. You may come any time during a session, but expect to stay a full hour. That means that you must leave enough time for the entire process. Do not come the last 10 mins of the session and expect to finish. Don't forget that the sessions are outside, so dress warmly. The weather is unpredictable, so go early in the semester.

Solar Observing

Daytime sessions to observe the sun are held at the Campus Observatory. You are required to go to one session at any of the several dates that will be posted online (<http://www.astro.uiuc.edu/classes/obs.shtml>). You may go any time during these hours; the session will take about 30 min for observing and hearing a presentation from the TA on duty. As with nighttime observing, the weather is unpredictable, so go early. Note that both night and solar observing are required. While you only need to observe for one night and one day, you must be available to do this for several occasions, since there is no way to guarantee that weather will permit observing on any one day or night. If you are unavailable for night or solar observing, see the instructor immediately. If you don't go to an observing session then your report will not be accepted.

Planetarium

Special presentations designed for Astronomy students will be held at Staerkel Planetarium at Parkland College (on Bradley Avenue in Champaign). Show dates: Shows will be held on to be announced dates. You must make a reservation at the UIUC website ahead of time (<http://www.astro.uiuc.edu/classes/planetarium/>). Sessions start at 6:35pm and run for about an hour. A \$3 charge is required and must be paid in cash at the planetarium. You are responsible for your own transportation. Maps and bus schedules are available online. A form will be posted on the class website, and will contain a series of questions about what you learn during your visit.

Stardial

You will get a feel for how modern astronomers take real data by observing a variable star using the *Stardial* camera that is mounted on the roof of the Astronomy building. Every night, the *Stardial* camera automatically takes pictures of the sky, and posts them on

the Web. This is where you will get your data. The class webpage has forms that contain instructions on how to use Stardial. The forms also contain questions you should answer about the variable stars you observe.

Reports for All Observing

Forms will be made available, containing instructions and questions to be answered before, during, and after your night and solar observing sessions and the planetarium visit, as well as the Stardial activities. The planetarium report is due in class **Friday, March 4th**. The night observing report is due in class **Friday, March 11th**; to encourage early attendance, extra credit of points will be given for night observing reports turned in by **Friday, March 1st**. The solar observing report is due in class **Friday, April 8th**. The Stardial reports are due in class on **Friday, February 11th** and **Friday, April 19th**. Late reports will be deducted -5 points per calendar day late.

Exams

Exams will be two one-hour midterm exams and a comprehensive final exam. The exams will consist of short answers and essay questions. Dates are as follows.

- Hour Midterm Exam: In class Friday, February 18th
- 2nd hour exam in class on Friday, April 1st
- Final Exam: **1:30-4:30 pm Tuesday, May 10th**

Academic Integrity and Collaborative Work

Academic honesty is essential to this course and the University. Any instance of academic dishonesty (including but not limited to cheating, plagiarism, falsification of data, and alteration of grade) will be documented in the student's academic file. In addition, the particular exam, homework, or report will be given a zero.

Guidelines for collaborative work: Discussing course material with your classmates is in general a good idea, but each student is expected to do his or her own work. On homework, you may discuss the questions and issues behind them, but you are responsible for your own answers. In writing observing and planetarium reports, you may discuss with classmates during the activity, but again, you must give your own answers in your own words. Finally, on exams your work and your answers must of course be your own.

For further info, see http://www2.uiuc.edu/admin_manual/code/rule_33.html.

Accessibility Statement

To insure that disability-related concerns are properly addressed from the beginning, students with disabilities who require reasonable accommodations to participate in this class are asked to see the instructor as soon as possible.

Course Schedule

Note that the lecture material may vary, but assignments are fixed. Remember to check the webpage for the most up to date schedule.

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