

ASTR 1120-001: General Astronomy -- Stars and Galaxies Spring 2009: T, Th 2:00-3:15, G1B30

Instructor

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Course webpages are accessible via CULearn using your CU login name and IdentiKey password. Log on at <https://culearn.colorado.edu>. To download this syllabus, see <http://origins.colorado.edu/~jdarling/astr-1120.html>.

Important Dates

Jan 13: First day of class
Feb 12: In-class midterm exam 1
Feb 20: Last day to inform me if you need to reschedule final exam date
Mar 10: In-class midterm exam 2
Mar 23-27: Spring Break, no classes
Apr 16: In-class midterm exam 3
Apr 23: Homework N (observing/public lecture/blog entry) due
Apr 30: Last day of classes
May 2: Final Exam (07:30 PM - 10:00 PM G1B30)

Course Goals

- Learn critical thinking skills: scientific reasoning and argument using logic, observation, and evidence.
- Learn the process of scientific discovery. Understand *how* we know what we know about the universe, what we *don't* yet know, and the limits of *what* can be known.
- Gain knowledge and appreciation of the scope, scale, and phenomena of the physical universe.
- Learn quantitative reasoning skills.

Course Description. This course is half of a two-semester astronomy survey intended for non-science majors. The course is organized around three questions: What is a star's life cycle? What is a galaxy's life cycle? What is the Universe's life cycle? We will discuss what astronomers know today about the answers to each of

these questions. More broadly, I hope to convince you that, via a combination of careful observation and theory, science allows us to confidently answer some questions that lie far outside the realm of everyday experience.

Prerequisites. No formal prerequisites. ASTR 1120 and 1110 (or 1010) may be taken in either order to satisfy core curriculum requirement in natural science. We will make extensive use of simple algebra and scientific notation.

Required Materials. *The Cosmic Perspective*, 5th Edition by Bennett, Donahue, Schneider and Voit. I will assign regular readings from this book. We will not be using the astronomy media workbook. Make sure you have the correct edition.

Mastering Astronomy - Access to the online material (tutorials, homework, etc.) at <http://www.masteringastronomy.com> is also required for this class. New textbooks come with an access code for the online material. Access to the online material is also available for \$30 for those whose purchase a used copy of the text. You should register with our class on that site, using my instructor name and the class ID of **ASTR1120Darling**, since only then will your work on assignments there count for credit. (If you took ASTR 1110 or any other course that used MA within the last year, you should NOT need to purchase a new access code.)

iClicker – you will need to purchase an iClicker for in-class participation, if you don't already own one. See section on clickers below.

Coursework and Grading

Grading philosophy. The amount you will learn depends on how much thought and practice you put in distributed sensibly over the term. Everyone who puts in the 6-9 hours of recommended study time outside of class and diligently completes all the assigned work on time will pass, normally with a grade of at least a B. It will take hard and persistent work on your part to earn an A, however.

Your final grade in the course will be based on the following:

- 10% Daily clicker questions, class participation, and reading quizzes
 - Lowest 4 daily clicker grades dropped
 - Lowest 2 reading quizzes dropped
- 25% Written and online homework
 - Lowest 2 homework grades dropped
- 20% *Each* of three in-class midterm exams (Feb 12, Mar 10, Apr 16)
 - Lowest midterm exam grade dropped
- 25% Comprehensive final exam (May 2)

Letter grades will be assigned based on the total grade, roughly spaced in 10% intervals. I may revise these limits, but only downwards (which will improve your grade).

Note that the total grading percentage above adds up to 120%. To make it add to 100%, I will drop your lowest midterm exam score. With this “freebie,” you may excuse yourself from one of the midterm exams for any reason. The final exam is mandatory

and cumulative, so even if you miss a midterm exam, you are responsible for knowing the material covered in that exam.

Homework will be assigned on a weekly basis throughout the semester. Written homework will be due at the beginning of the class on the due date; online homework is due by 5:00 pm on the due date (usually Fridays). You are encouraged to work together and exchange ideas in groups. However, anything you turn in for a grade must be your own work. Copying is not permitted and is a violation of the honor code. See section on Honor Code below

Late Homework & Make-up Tests

No make-up midterm exams will be given, since you can excuse yourself from one midterm exam, as described above. If you know in advance that you will miss two or more midterm dates or the final exam date for any legitimate reason (religious observance, school sanctioned trip, scheduled surgery, etc.) you must make arrangements with me at least one week before the first midterm exam, or at latest by Friday, Feb 20 (CU policy).

No late homework assignments will be accepted for any reason, as we will occasionally discuss solutions in class, and it is important that you keep up with the assignments. I will drop your two lowest homework scores (except for Homework N, see below, which you must complete) without penalty, so you can use these “freebies” to excuse yourself from two homeworks during the semester.

Use your “freebies” to excuse yourself from 2 homeworks, one midterm exam, two reading quizzes, and 4 in-class clicker days, if necessary.

Campus policy regarding religious observances requires that faculty make every effort to reasonably and fairly deal with all students who, because of religious obligations, have conflicts with scheduled exams, assignments or required attendance. See full details at http://www.colorado.edu/policies/fac_relig.html
Please notify me in advance of exams (see above) and one week in advance of assignment due dates if you cannot attend class or turn in an assignment due to a religious holiday and we will make an alternative arrangement.

Clickers. Each of you will need to purchase a wireless student response system (“iClicker”). Several times during each class I will ask questions to get you to think carefully about some of the concepts we have covered. Often I will have you talk to your neighbors before answering, so you can help each other figure out the correct answer. Use of clickers:

- Improves your grade. When you discuss and debate with others your knowledge improves.
- Gives *YOU* immediate feedback regarding what you do and do not understand.
- Tells *ME* what the class does and does not understand.
- Greatly improves class participation

Class will usually start with one or two straightforward, *graded* clicker questions from the assigned reading. *Do your reading before class!!*

Your worst 4 days of clicker scores will be dropped. This will cover you if you are sick, have a family emergency, or need to miss class for any other reason. This will also cover technical problems with your clicker (if you are using a clicker from a previous class, *replace your batteries now!*) Clickers will be graded as:

0 pts	No answer
1 pt	Wrong answer
2 pts	Right answer

You **must** register your clicker on CU Connect, <https://cuconnect.colorado.edu> For instructions on how to register, see <http://www.colorado.edu/its/cuclickers/students/register.html>

Using someone else's clicker is a violation of the Honor Code and both you and the person whose clicker you are operating will receive an F in the course and be reported to the University Honor Council for discipline.

Homework N. In addition to the weekly assigned homeworks, you will be required to complete one additional assignment, "Homework N," outside of class. Homework N is mandatory and may not be dropped as a "freebie." This homework may consist of **one** of the following:

1. Attend an observing night at Sommers Bausch Observatory (see below), and turn in observation sheets for 3 objects (copy the sheet at the end of this syllabus – copy machine not available at the observatory).
2. Attend a public lecture on an astronomy-related project, and write a 1-2 paragraph summary of the lecture.
3. Submit a 500-word guest blog entry to me on a recent popular press news item or topic of special interest about an astronomy-related subject. Blog entries will be visible to the class and open to comments and discussion online. I will allow only three blog entries per week on a first come, first-served basis. Please contact me with a topic before you write your entry.

I will announce astronomy-related public lectures in class. If you choose to attend a lecture other than those announced, contact me first to make sure it is appropriate for fulfilling this assignment. Likewise, if you choose to present a blog entry, contact me beforehand about your article selection and presentation time. **Do not wait until the end of the semester to sign up for a blog date, attend a public lecture, or sign up for observing.**

If you choose to attend an observing night, the Sommers Bausch Observatory (SBO) has been reserved for the exclusive use of the 1120 class at the dates and times in the table below. You will need to sign up for a slot on the course website on CULearn – sign up early to get the night of your choice.

DAY	DATE	START	MOON IN SKY
Thu	Jan 22	7:00	dark
Mon	Feb 09	7:00	MOON
Tue	Feb 24	7:00	dark
Wed	Mar 11	8:00	rises at 9:11
Thu	Apr 02	8:30	MOON
Mon	Apr 20	8:30	dark

Honor Code. All students of the University of Colorado at Boulder are responsible for knowing and adhering to the academic integrity policy of this institution. Violations of this policy may include: cheating, plagiarism, aid of academic dishonesty, fabrication, lying, bribery, and threatening behavior. All incidents of academic misconduct shall be reported to the Honor Code Council (honor@colorado.edu; 303-725-2273). Students who are found to be in violation of the academic integrity policy will be subject to both academic sanctions from the faculty member and non-academic sanctions (including but not limited to university probation, suspension, or expulsion). Other information on the Honor Code can be found at <http://www.colorado.edu/policies/honor.html> and at <http://www.colorado.edu/academics/honorcode/>

The Honor Code Mission: Honor is about academic integrity, moral and ethical conduct, and pride of membership in a community that values academic achievement and individual responsibility. Cultivating honor lays the foundation for lifelong integrity, developing in each of us the courage and insight to make difficult choices and accept responsibility for actions and their consequences, even at personal cost. As citizens of an academic community of trust, CU-Boulder students do not lie or cheat whether they are on campus or acting as representatives of the university in surrounding communities. Neither should they suffer by the dishonest acts of others.

I have a very simple rule regarding the quoting or use of material obtained through the web or elsewhere: *Anything that is not your own work should be in quotes, as in "this is a sentence that I copied" (cite X)* and should preferably be accompanied by an appropriate citation of the source. Violation of the quotes rule will earn you an F in the class, and you will be referred to the Honor Council for discipline. The primary goal of this class is for you to learn, and cheating undermines this primary goal. If you find yourself under circumstances or pressures which cause you to consider cheating, please come see me.

CULearn. Course announcements, lectures, and grades will be posted on CULearn (log on with your identikey username and password). It is your responsibility to check the course website frequently to view announcements.

Fiske Planetarium. CU's Fiske Planetarium will be reserved at the usual class time several days throughout the semester. You should go directly to Fiske on these days. Check online at the course website to check for Fiske dates. These dates will also be announced ahead of time in class.

Classroom Behavior & Common Courtesy

I expect you:

- To give the class your full attention
- To arrive on time, prepared to learn when class starts.
- To not leave class early, and to not rustle papers in preparation for leaving class.
- To not sit in the balconies: enrollment is low enough for all students to sit in the main classroom, which fosters interaction and participation.
- To please turn off cell phones in class. Texting during class is not allowed.
- To keep laptops closed during class.

You may expect me:

- To foster a positive, respectful, collegial, and inclusive learning environment.
- To finish lectures on time.

Students and faculty each have responsibility for maintaining an appropriate learning environment. Those who fail to adhere to such behavioral standards may be subject to discipline. Professional courtesy and sensitivity are especially important with respect to individuals and topics dealing with differences of race, culture, religion, politics, sexual orientation, gender, gender variance, and nationalities. Class rosters are provided to the instructor with the student's legal name. I will gladly honor your request to address you by an alternate name or gender pronoun. Please advise me of this preference early in the semester so that I may make appropriate changes to my records. See policies at <http://www.colorado.edu/policies/classbehavior.html> and at http://www.colorado.edu/studentaffairs/judicialaffairs/code.html#student_code

Discrimination and Harassment. The University of Colorado at Boulder policy on Discrimination and Harassment, the University of Colorado policy on Sexual Harassment and the University of Colorado policy on Amorous Relationships apply to all students, staff and faculty. Any student, staff or faculty member who believes s/he has been the subject of discrimination or harassment based upon race, color, national origin, sex, age, disability, religion, sexual orientation, or veteran status should contact the Office of Discrimination and Harassment (ODH) at 303-492-2127 or the Office of Judicial Affairs at 303-492-5550. Information about the ODH, the above referenced policies and the campus resources available to assist individuals regarding discrimination or harassment can be obtained at <http://www.colorado.edu/odh>

Students with Disabilities. If you qualify for accommodations because of a disability, please submit to me a letter from Disability Services in a timely manner so that your needs may be addressed. Disability Services determines accommodations based on documented disabilities. Contact: 303-492-8671, Willard 322, and <http://www.Colorado.EDU/disabilityservices>

ASTR 1120 - Section 1 - Prof. Darling
Spring 2009 – PRELIMINARY SCHEDULE FOR THE SEMESTER

Please note that this schedule is provided to give you some idea of how the semester will go, but will be revised. Exam dates will stay the same, but as the semester goes on, reading, class lecture topics and assignments may change dates and additional assignments may be added. Please consult the calendar on CULearn for a current course.

Reading: All reading is from The Cosmic Perspective and should be done before class.

MA: Mastering astronomy homework, submitted online, due Friday at 5pm.

RQ: Reading quiz. These short assignments should be easy after completing the assigned reading and should be submitted via Mastering Astronomy by noon the day of the lecture.

HW: Written homework, due at the beginning of class, in class. There are five of these. You can get these assignments from the CULearn website about 1 week before they are due.

Week	Date		Topic	Reading	Due
1	Tue Thu	13 Jan 15 Jan	Welcome/Overview, Astronomy Our Place in the Universe	Ch 1, 3.1,3.4	RQ1, MA Intro
2	Tue Thu	20 Jan 22 Jan	Energy, gravity and laws of motion Night sky, light, and observation	Ch 4 Ch 5	RQ4 RQ5, MA1
3	Tue Thu	27 Jan 29 Jan	Night sky, light, and observation Telescopes	Ch 6	RQ6, MA2, HW1
4	Tue Thu	3 Feb 5 Feb	The Sun The Sun	Ch 14	RQ14 MA3
5	Tue Thu	10 Feb 12 Feb	The Stars EXAM #1	Ch 15	RQ15
6	Tue Thu	17 Feb 19 Feb	The Stars Star Birth	Ch 16	RQ16, MA4, HW2
7	Tue Thu	24 Feb 26 Feb	Star Stuff Star Stuff, Star Death	Ch 17	RQ17 MA5
8	Tue Thu	3 Mar 5 Mar	Star Death Relativity, Gravity, and Black Holes	Ch 18 S2	RQ18 MA6
9	Tue Thu	10 Mar 12 Mar	EXAM #2 Relativity, Gravity, and Black Holes	S3	
10	Tue Thu	17 Mar 19 Mar	Milky Way Milky Way	Ch 19	RQ19 MA7, HW3
		23-27 Mar	Spring Break - No Class		---
11	Tue Thu	31 Mar 2 Apr	Galaxies Galaxies	Ch 20	RQ20 MA8
12	Tue Thu	7 Apr 9 Apr	Galaxy Evolution Galaxy Evolution	Ch 21	RQ21 MA9, HW4
13	Tue Thu	14 Apr 16 Apr	Dark Matter EXAM #3	Ch 22	RQ22
14	Tue Thu	21 Apr 23 Apr	Dark Matter, Dark Energy, and Fate The Big Bang	Ch 23	RQ23, MA10, HWN
15	Tue Thu	28 Apr 30 Apr	The Big Bang Make-up, Review		MA11, HW5
	Sat	2 May	FINAL EXAM (Cumulative) in G1B30 7:30pm - 10:00pm		

SBO Observation Sheet

(Make 3 copies and bring with you to observing night. No copy machine is available at SBO.)

Your Name: _____

Date: _____

Signature of TA: _____

Object Observed: _____

Sketch of Object:

In the space below, explain what you saw (you can use your textbook or the Internet to help you by either looking up the specific object you observe or that type of object). Do this by answering these questions: What is the object? Does the emission (light) you observe come from one source or many (e.g., a star, many stars, interstellar gas)? What is the source of energy for the emission you observe? If you can see any color, try to give a reason for it (i.e., temperature, interstellar extinction, elemental composition).