

AST 010G 001 FQ 2023

[Jump to Today](#)  Edit

Astronomy 10G

Introduction to Astronomy

2023 Fall

Classes

Roessler 66

Tue, Thu 3:10 - 4:30 pm

Recitation section

Physics 416

Mon 11 am - 12 pm

Instructor

Prof. Andrew Wetzel

Contact: please use Canvas mail (NOT email), I generally will respond between 9 am - 5 pm. Please direct all questions via Canvas mail about the problems in the reading quizzes and problem sets to the TA.

Office: Physics 533

Office hours: Wed 2 - 3:30 pm (may be in Physics 525 if many students)

TA

Kelsey Glazer

Contact: please use Canvas mail (NOT email). Please direct all questions via Canvas mail about the problems in the reading quizzes and problem sets to the TA.

Office: Physics 531

Office hours: Wed 12 - 2 pm in Physics 416

Recitation section: Mon 11 am - 12 pm in Physics 416

Overview

This course is a *quantitative* introduction to astronomy. We will cover the history, content, and fate of the universe. Turns out, the universe is *big*, and one quarter is not nearly enough time to cover everything. So, we will cover some of the cool stuff and provide you with the background to understand some of the crazy stuff that you read about in the news: black holes, exploding stars, the birth of galaxies, the expansion of the Universe. The first third of the class will cover scientific methods, the forces of nature, matter, and energy, to provide the needed background. The second third will focus on the Sun, stars, their life cycles, black holes, and General Relativity. Finally, we will learn about the Milky Way, other galaxies, and the observable history of the universe, including the expansion and the Big Bang.

This course will involve math and quantitative analysis. This is an essential aspect of science.

Come, have fun, and be awed by the wonders of the Universe. The sky is **not** the limit, it is just the beginning!

Key learning goals

One integral part of this course is for you to develop proficiency in visual analysis of scientific images, movies, figures, charts, and tables, including understanding ideas presented visually and the ability to communicate knowledge by visual means. For example, we will ask you to interpret images and spectra from astronomical objects, including what these can tell us physically about these objects. You also will develop skills to interpret x-y type plots, charts, and tables of astronomical data. We will employ such visual analysis in every class, and we will evaluate your understanding through weekly reading quizzes, weekly problem sets, and 3 exams, which will include both interpreting visual data and communicating your answers through visual means.

Another key goal of this course is for you to be able to use the scientific method to approach problems, pose questions, analyze data, and make conclusions. We will devote an entire class to discussing the meaning and philosophy behind the scientific method, and we will use it continuously throughout the course to understand astrophysical phenomena. Many of the questions that you will answer throughout the course will involve quantitatively analyzing astronomical data. We also will aim to relate your understanding of astronomy to other disciplines, including physics, chemistry, biology, history, and public policy.

Learning philosophy and effective learning


Science is not a set of information - *it is a way of thinking*.

Studies on the efficacy of learning consistently demonstrate that *active* learning, in which *you* take a driver's seat to your learning, is more effective than (just) one-way lecture format. In fact, research has shown that everything that makes learning *feel* easy, in fact, contributes to making it less effective! This means that you have to struggle with the material at some level to achieve deep learning.

While this requires a bit more work from you, the effectiveness of your learning will be substantially higher - you will learn more and remember it better if you engage in active learning.

This [NY Times article](https://www.nytimes.com/2023/04/20/opinion/studying-learning-students-teachers-school.html) , nicely discusses empirical evidence for ways to study more effectively.

I **highly** recommend this [series of videos](https://www.youtube.com/playlist?app=desktop&list=PL0IAafWhXIEAqiSfmx8TKF9JuBS6swFac) , by Steve Chew on effective studying.

Perhaps the most important step in active learning is for you to adopt a [growth mindset](https://fs.blog/carol-dweck-mindset). .

UC Davis offers useful tips for effective [active learning](https://cee.ucdavis.edu/sites/g/files/dgvnsk5371/files/media/documents/Active_Learning_Part_9_JITT.pdf) .

Textbook

The Cosmic Perspective: Stars, Galaxies, and Cosmology, 10th edition, published in 2023

Bennett, Donahue, Schneider, Voit


<http://www.mypearsonstore.com/bookstore/cosmic-perspective-stars-and-galaxies-0134990781> , <https://www.pearson.com/en-us/subject-catalog/p/cosmic-perspective-the/P200000009792/9780138185251>

Expert TA online platform

We use the Expert TA online platform. theexpertta.com , for all reading quizzes and problem sets. You first must register using this link:

<http://goeta.link/USB06CA-616221-328> .

Enter your email, first name, last name, and then you can redeem your Equitable Access code. (I strongly recommend that you enroll in the Equitable Access program, but if you choose not to, you can pay via credit card, bookstore access code, or enroll in a 14-day free trial.)

Then, you will log into theexpertta.com  to see and complete all of your assignments. We aim to release/publish these by the Friday before they are due. You can work on and submit your answers any time before they are due.

For most questions, you have 2-3 attempts to get the answer correct, though with reduced credit for each resubmission. Some questions allow you to request a 'hint' before answering for a small score penalty. If you do not get the answer correct, some questions then allow to you request 'feedback' on your incorrect answer, again for a small score penalty. For many questions, however, there are no hints or feedback.

Expert TA has its own online astronomy 'textbook', which is a useful supplementary resource, and I encourage you to read at it as well. But all of the assigned reading for this course will be from our main textbook, the Cosmic Perspective.

Direct all Canvas mail questions about the problems in the reading quizzes and problem sets to the TA.

Grading

10% weekly reading quizzes (online)

20% weekly problem sets (online)

20% midterm 1 (in class)

20% midterm 2 (in class)

30% final exam (in class)

We will drop your single lowest-scored quiz and your single lowest-scored problem set when calculating your final grade. So if you have an emergency in any given week, it will not hurt your final grade.

The final grade that you **earn** in this course will be based on an adaptive ('curved') grading scale. *This is generally to your benefit, because it ensures an equitable final grade distribution, even if my exam questions end up being extra difficult this quarter.* As such, we do not assign a grade to an individual problem set or exam, we only score them as a percentile and compute your final percentile (to compute your final grade) using the weighting above.

To give you some sense of a typical grade distribution, here are the final grade cutoffs from the previous time I taught this course. However, **these are not necessarily the actual cutoff scores for this course: we will compute them based on everyone's final score distribution.**

A- : roughly 87%


B- : roughly 77%

C- : roughly 67%


D- : roughly 57%

Reading quizzes

In order to get the most out of class, you should read the chapters **beforehand**, so you are familiar with the material that we will cover in class. *Expect to spend 2 - 3 hours per week reading the textbook.*

We will have weekly reading quizzes (online via [Expert TA](http://theexpertta.com) ) to encourage you to read the textbook before class, think about the material, and give you credit for doing so. These quizzes are just a few simple conceptual questions that should be straightforward to answer if you read the textbook. They are due **every Tuesday by 1 pm, and we will not accept any late submissions**. Do not wait until the last minute, in case you encounter technical issues. These questions will be similar to (and in some cases identical to) exam questions, so they provide an good way to prepare for the exams. In addition, your scores will help me to tailor each class to the topics that you found most confusing.

Problem sets (homework)

We will have weekly problem sets (online via [Expert TA](http://theexpertta.com) ) to help you digest the course material. They are due **every Friday by 1 pm (except weeks when we have a midterm exam), and we will not accept any late submissions**. Do not wait until the last minute to submit, in case you encounter technical issues. The midterm and final exams will be based on problems similar (and in some cases identical) to those in the problem sets. Therefore, it is *imperative* that you keep up with the problem sets, which gives both you and me feedback about how well you understand the course material before the exams.

We *strongly* encourage you to attend office hours to work on your problem sets and ask us questions. *This is the best way to ask us questions about the problems.* If you are unable to attend office hours, you are welcome to send questions via Canvas mail, please direct those to the TA.

Exams

We will have three in-class exams to evaluate your understanding of the course material. The topics for these questions will come from the textbook and class discussion. The exams will be multiple choice plus short answer, will cover specific chapters, and will be cumulative in the sense that most lectures build on materials from the previous lectures. **We will not offer any make-up exams, except for documented emergencies (with written proof, such as a doctor's note).**

For each exam, we will choose at least one question each from (1) a problem set, (2) a reading quiz, and (3) in-class questions. Thus, your coming to class, thinking through the questions, completing the problem sets and online quizzes, are excellent ways to prepare for the exams.

The exam dates are

Midterm 1: Oct 19 (Thursday) at 3:10 - 4:30 pm in class

Midterm 2: Nov 16 (Thursday) at 3:10 - 4:30 pm in class

Final exam: Dec 13 (Wednesday) at 8 - 10 am in class

Late enrollment

If you enrolled late, be sure to read the chapters of the textbook and review the slides from the classes that you missed. *We do not allow for 'make-up' work for any reading quizzes or problem sets that you missed.* As described above, we drop your lowest-scored reading quiz and lowest-scored problem set in computing your final grade, so if you missed those in the first full week, it should not affect your final grade.

Slides from class

I will post a PDF of our slides from each class. You can access them via the 'Files' link at the left, under the 'class slides' folder. I do this primarily to help you review what we covered in class, and to help those of you who have to miss class for sickness, etc. *However, I implore you to attend and participate in class in person throughout the quarter and not just use these slides as a substitute for that!* We will have much more in our classes than just these slides, including movies, interactive demonstrations, and interactive questions.

Academic conduct

This course will abide by the UC Davis [Code of Academic Conduct \(http://sja.ucdavis.edu/files/cac.pdf\)](http://sja.ucdavis.edu/files/cac.pdf). You are **required** to acknowledge your responsibilities regarding the Code of Academic Conduct for each registered course at [participate.ucdavis.edu \(http://participate.ucdavis.edu\)](http://participate.ucdavis.edu), reinforcing our campus culture of honesty. You also should familiarize yourself with the [Student Responsibility and Conduct Standards \(http://sja.ucdavis.edu/scs.html\)](http://sja.ucdavis.edu/scs.html) in general.

We will report any evidence of cheating on problem sets, exams, or quizzes to Student Judicial Affairs. Students who violate the Code of Academic Conduct are subject to disciplinary sanctions that include: censure, probation, suspension, deferred separation, or dismissal from the University of California. Please do not jeopardize your college career over a few points!

Three common and reportable violations that you need to avoid:

1) Plagiarism

You are not permitted to copy word-for-word text from another source (like your textbook). You either need to paraphrase or cite the source. See [here \(http://sja.ucdavis.edu/faq.html#20\)](http://sja.ucdavis.edu/faq.html#20) for the definition of plagiarism and how to get help with learning about how to cite sources properly.

2) Misuse of an instructor's course materials or the materials of others

You are not permitted to use previous class solution sets or any other existing solutions to the exams, quizzes, or problem sets. See the description of misconduct [here \(http://sja.ucdavis.edu/files/cac.pdf\)](http://sja.ucdavis.edu/files/cac.pdf).

3) Unauthorized distribution of course materials or recording of lectures

You may not make audio or visual recordings of lectures or class presentations without my advanced written consent. Recording of lectures or class presentations made with my advanced consent is authorized solely for the purposes of individual or group study with students enrolled in the same class unless given explicit written consent for other uses. The recording may not be reproduced or distributed in any manner, including the Internet, without my written consent.











You may work on your problem sets together, but you individually must submit your own version. I encourage you to work collaboratively. **However, this is fundamentally different than copying.** If we detect copying, we will report it to Student Judicial Affairs.











The TA and I will hold weekly office hours, to help you out with any questions that you may have on either the problem sets or the material covered in class.

Observing lab (fall quarter and spring quarter)

If you want to spend one night per week looking at the sky through telescopes, to see many of the objects that we talk about in class, while having a lot of fun, I encourage you to sign up for the *optional* 1-unit Astronomy 10L, offered in fall and spring quarters.

Course Summary:

Date	Details	Due
Tue Oct 3, 2023	 reading + quiz 1 (https://canvas.ucdavis.edu/courses/827706/assignments/1120126)	due by 1pm
Thu Oct 5, 2023	 problem set 1 (https://canvas.ucdavis.edu/courses/827706/assignments/1120125)	due by 1pm
Tue Oct 10, 2023	 reading + quiz 2 (https://canvas.ucdavis.edu/courses/827706/assignments/1121186)	due by 1pm
Fri Oct 13, 2023	 problem set 2 (https://canvas.ucdavis.edu/courses/827706/assignments/1121188)	due by 1pm
Tue Oct 17, 2023	 reading + quiz 3 (https://canvas.ucdavis.edu/courses/827706/assignments/1121189)	due by 1pm
Thu Oct 19, 2023	 midterm exam 1 (https://canvas.ucdavis.edu/courses/827706/assignments/1120122)	due by 4:30pm
Tue Oct 24, 2023	 reading + quiz 4 (https://canvas.ucdavis.edu/courses/827706/assignments/1141522)	due by 1pm
Fri Oct 27, 2023	 problem set 3 (https://canvas.ucdavis.edu/courses/827706/assignments/1141549)	due by 1pm
Tue Oct 31, 2023	 reading + quiz 5 (https://canvas.ucdavis.edu/courses/827706/assignments/1141536)	due by 1pm
Fri Nov 3, 2023	 problem set 4 (https://canvas.ucdavis.edu/courses/827706/assignments/1141550)	due by 1pm

Date	Details	Due
Tue Nov 7, 2023	 reading + quiz 6 (https://canvas.ucdavis.edu/courses/827706/assignments/1141538)	due by 1pm
Fri Nov 10, 2023	 problem set 5 (https://canvas.ucdavis.edu/courses/827706/assignments/1141551)	due by 1pm
Tue Nov 14, 2023	 reading + quiz 7 (https://canvas.ucdavis.edu/courses/827706/assignments/1141540)	due by 1pm
Thu Nov 16, 2023	 midterm exam 2 (https://canvas.ucdavis.edu/courses/827706/assignments/1120123)	due by 4:30pm
Tue Nov 21, 2023	 reading + quiz 8 (https://canvas.ucdavis.edu/courses/827706/assignments/1141541)	due by 1pm
Tue Nov 28, 2023	 reading + quiz 9 (https://canvas.ucdavis.edu/courses/827706/assignments/1141544)	due by 1pm
Fri Dec 1, 2023	 problem set 6 (https://canvas.ucdavis.edu/courses/827706/assignments/1141552)	due by 1pm
Tue Dec 5, 2023	 reading + quiz 10 (https://canvas.ucdavis.edu/courses/827706/assignments/1141546)	due by 1pm
Fri Dec 8, 2023	 problem set 7 (https://canvas.ucdavis.edu/courses/827706/assignments/1141553)	due by 1pm
Wed Dec 13, 2023	 final exam (https://canvas.ucdavis.edu/courses/827706/assignments/1120124)	due by 10am