# Stars, Galaxies, and the Cosmos
## ASTRON 0089, Summer 2025


**Instructor:** Dr. David Nero
**Office Hours:** Monday through Thursday by appointment.

**Office Phone:** (412) 624-7394
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**Lecture:** Monday and Wednesday, 9:30am–12:10pm on Zoom
**Recitation** Monday and Wednesday, 12:15pm–12:50pm on Zoom
**Class Website:** Canvas (canvas.pitt.edu)

**Textbook:** *Understanding Our Universe 4th edition* (Inclusive Access)

## Course Description

This is a self-contained course for students not majoring in the physical sciences. The Universe in which we live is an unimaginably vast and rich place that is understandable through the same physical laws that govern our existence here on Earth. By exploring topics ranging from our nearest neighboring stars and their alien worlds to the farthest galaxies newly formed after the Big Bang, this course will engage your mind to better understand our Universe and your everyday world. Through active and engaged participatory lectures, we will observe the cosmos and learn about the birth, life, and death of stars and their mysterious remnants: pulsars and black holes. From studying stars and our own Milky Way Galaxy, we will expand our vision to cosmology and investigate the origin and ultimate fate of the Universe.

## Course Learning Objectives

- Describe the relative sizes of planets, stars, galaxies, and the observable universe
- Relate the motions of the earth, moon, and sun to seasons, moon phases, eclipses, and the apparent motion of the stars
- Summarize how the laws of physics and light allow us to understand the workings of the cosmos
- Characterize the properties of the sun and our solar system
- Describe the techniques used to study distant stars and compare them to the sun
- Explain how stars are born and how they die, in some cases creating black holes
- Describe our galaxy, the Milky Way, and how it has shaped our own solar system
- Characterize the different types of galaxy and how they can change throughout time
- Explore the mysteries of dark matter and the expansion of the universe
- Investigate how the universe began and how it may end

## Policies

**Attendance:** You will get the most out of this class if you actively participate. To that end, there will be graded assignments that require you to be present in class. I realize that some absences are unavoidable, so I will drop your two lowest day's worth of regular in-class work, no questions asked. If there are reasonable circumstances causing you to miss more assignments than I drop, accommodations will be made on a case-by-case basis.

**Electronic Communication:** Students are expected to regularly check their pitt.edu email and to regularly sign on to Canvas. Failure to read and react to University communications in a timely manner does not absolve the student from knowing and complying with the content of communications.

**Statement on Classroom Recording:** Class will be recorded for students to view later. Students may not distribute these recordings to anyone outside of the class, nor may they create their own recordings of the lectures, discussion, and/or activities without the advance written permission of the instructor, and any such recording properly approved in advance can be used solely for the student's own private use.

**Academic Integrity:** Students in this course will be expected to comply with the University of Pittsburgh's Policy on Academic Integrity. Any student suspected of violating this obligation for any reason during the semester will be required to participate in the procedural process, initiated at the instructor level, as outlined in the University Guidelines on Academic Integrity. To learn more about Academic Integrity, visit the Academic Integrity Guide for an overview of the topic. For hands-on practice, complete the Academic Integrity Modules.

**AI Use:** The use of Generative AI tools, including ChatGPT, is encouraged/permitted in this course with the following restrictions: AI may NOT be used to directly answer quiz/homework questions with no original thought on your part. You may NOT copy-and-paste your assignment into the AI tool and use its answer as your own. Instead, you may use AI tools to help brainstorm assignments or projects or to revise existing work you have written. You may ask it clarifying questions or as an advanced search engine.

**Disability Services:** If you have a disability for which you are or may be requesting an accommodation, you are encouraged to contact both your instructor and Disability Resources and Services (DRS), 140 William Pitt Union, (412) 648-7890, drsrecep@pitt.edu, (412) 228-5347 for P3 ASL users, as early as possible in the term. DRS will verify your disability and determine reasonable accommodations for this course.

**Title IX:** As your professor, I am required to report any incidents of sexual misconduct that are directly reported to me. You can also report directly to Office of Civil Rights and Title IX: 412-648-7860 (8:30am–5pm M–F) or via the Pitt Concern Connection at: Make A Report

If you wish to make a confidential report, Pitt encourages you to reach out to these resources:

- The University Counseling Center: 412-648-7930 (8:30am to 5pm M–F) and 412-648-7856 (after business hours)
- Pittsburgh Action Against Rape: 1-866-363-7273 (24/7)

If you have an immediate safety concern, please contact the University of Pittsburgh Police: 412-624-2121

## Grade Scale

If you achieve the following final grade percentages in the course, you will receive at least:

| Percentage | Minimum Grade |
|---|---|
| 90% | A- |
| 80% | B- |
| 70% | C- |
| 60% | D- |

I do not anticipate the need to curve grades, but if I do, it would only be in your favor. You are not competing with one another, and it is possible for everyone to get an A.

## Grading

| Assignment | % | Notes |
|---|---|---|
| Top Hat | 10% | lowest 2 dropped |
| Quizzes | 20% | lowest 2 dropped |
| Homework | 50% | |
| Recitation | 20% | lowest 2 dropped |

### Top Hat

Each lecture, there will be several questions posed for you to answer using Top Hat. You can access Top Hat through Canvas or using their mobile app. The University is already paying for Top Hat, so you don't need to pay anything extra. Grading will be 80% credit for participation, and 20% credit for correctness. As detailed under "Attendance" above, your lowest scores are dropped.

### Quizzes

During each class, there will be a short quiz using the online platform *Smartwork* (included with the textbook). These quizzes are open book/notes and you are encouraged to discuss your answers with your classmates. To that end, students who wish to work together will be placed in the same Zoom breakout room (up to three), while students who wish to work alone will be placed into their own breakout room.

### Homework

Each lecture is paired with a homework assignment that involves a short project where you to lookup some information and/or complete some kind of activity. To earn top marks, you must use these assignments to demonstrate that you understand the course material well enough to make connections between the different topics we cover. A student of astronomy should be able to answer open-ended questions by combining multiple ideas supported with evidence. Homework is accepted late a 20% per day penalty.

### Recitation

Each recitation (after the first) is built around a recent astronomy-related news article that you find, read, and discuss. Your grade is based on parts: preparation (due the night before) and participation (assessed during recitation).