Stars, Galaxies, and the Cosmos
ASTRON 0089, Summer 2022

Instructor: Dr. David Nero
Office Hours: After recitation—let me know by the end of class if you're coming.

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Meeting Times: Monday and Wednesday, 9:30am–12:10pm in 104 Thaw Hall
Recitation is 12:15–12:50pm in 11 Thaw Hall.
Class Website: Canvas (canvas.pitt.edu)

Textbook: *21st Century Astronomy* (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 determine the motions of celestial objects
- Explain the properties of light and how telescopes are used to observe the sky
- Characterize the workings 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

Late Assignments: Assignments will be assessed a penalty of 20% per day late. Exceptions will be made for cases of emergency, as long as you let me know promptly.

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.

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. This may include, but is not limited to, the confiscation of the examination of any individual suspected of violating University Policy.

Examples of violations that I've seen and prosecuted include collaborating with another person during an individual assignment, looking up answers to a graded assignment online (using Chegg or any other website), and submitting another person's work as their own.

To learn more about Academic Integrity, visit the Academic Integrity Guide for an overview of the topic. For hands-on practice, complete the Understanding and Avoiding Plagiarism tutorial.

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.

Statement on Classroom Recording: Lectures will be recorded for students to view later. These recordings will only be available to students registered for the class. 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.

Title IX:

> "No person in the United States shall, on the basis of sex, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any education program or activity receiving Federal financial assistance."

As a professor I am a mandatory reporter, and I am required to report violations of Title IX that I observe or am made aware of to the Title IX office. Title IX violations include, but are not limited to, sexual harassment, sexual violence and verbal or sexual abuse. Within the classroom, behavior in violation might appear as: suggestive jokes or innuendos, inappropriate touching, and unwanted sexual behavior or advances, but **my capacity and obligation to report does not end at the classroom**.

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
In-Class Questions	10%	lowest 2 dropped
Homework	60%	
Recitations	30%	lowest 2 dropped

In-Class Questions

There will be several questions posed during each class for you to answer using Top Hat. You can access Top Hat through Canvas or using their mobile app. In my opinion, the app is nicer. 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.

Homework

Most of your grade comes from homework assignments that are collected at the beginning of class. These assignments will test the learning objectives of the course in a variety of ways:

1. Short answer questions
2. Questions about real world (observing) or online (simulation) activities
3. Essay questions
4. Relating a recent news article to what you've learned in class

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. After all, anybody can look up a facts. A student of astronomy should be able to answer open-ended questions by combining multiple ideas supported with evidence.

Recitations

During recitation you will work on group assignments to help cement your understanding of the lecture that was just completed. Even though you will work together, each student will submit their own answers using the online platform *Smartwork5* (included with the textbook).