



## Concepts of Astrophysics II

ASTR 422/538

### Instructor Info



Prof. Diana Dragomir



PAIS 3226



[exoplanets.unm.edu](http://exoplanets.unm.edu)



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### Course Info



Undergraduates are required to complete ASTR 421 prior to taking this course.



Tue & Thu



9:30am - 10:45pm



PAIS 1160

### Office Hours



By appointment (or after class, time permitting).



PAIS 3226

### TA Info



Charlie Siders



[csiders@unm.edu](mailto:csiders@unm.edu)

### Course Overview

Astronomy 422/538 (Spring 2024) is intended for advanced (senior level) undergraduates, and is also counted as an elective for graduate students. This course covers galaxies and the Universe. We will start with the interstellar medium of our own Milky Way Galaxy. We will next discuss the structure of the Milky Way and other galaxies, galaxy evolution, clusters of galaxies and the large scale structure of the Universe. The last part of the course will focus on cosmology and the early Universe. A major emphasis of the course will be to instruct you on how to think and write like a scientist. Towards this goal, we will have four "journal club"-style presentations and discussions, as well as a term paper.

This is a three credit-hour course. Class meets for two 75-minute sessions of direct instruction for fifteen weeks during the Spring 2024 semester.

### About Me

I am an observational astronomer whose focus is on exoplanets. I aim to measure the properties of exoplanets, and how these properties correlate to the planets' formation and evolution. However, my interest in astronomy at all scales is keen, and I look forward to sharing that with you.

### Material

#### Required Text

*An Introduction to Modern Astrophysics*, 2nd edition, Bradley W. Carroll and Dale A. Ostlie (ISBN: 9780805304022)

#### Required Other Material

Zoom app.

### Grading Scheme

The details of the grading scheme and grading components could be subject to minor changes, but if so I will inform the class ahead of time during lectures and via email, and ensure that all students agree with the changes.

20%	Class Participation (including Journal Club presentation and assignments)
25%	Homework Assignments
20%	Final Project
15%	Mid-term Exam
20%	Final Exam

Note: If you take this class "Credit/No Credit", according to university policy, your final grade must be a "C" or better in order to receive credit.

### Class Participation

Class participation will consist of short calculations or problems to solve, thought experiments, or discussions related to the course material, either individually or in groups. I may sometimes select a student at random to briefly present their answers or the results of the group discussion. Sometimes we may cover together a problem from the homework that proved particularly challenging. You must be present in class and participate in these sessions in order to get the participation points.

An important component of the class participation grade will come from Journal Club-style assignments and presentations. There will be four Journal Clubs over the semester. I will select four papers, one for each. All students in the class must read each paper. A pair of students will lead each one, in the following way: one student will present an overview of the paper, while the other student will choose four questions submitted ahead of time by the rest of the class, and prepare and present answers. Students not assigned to a given paper will be required to submit a 0.5 - 1 page summary of the paper, as well as one question for the paper presenters.

## Homework Assignments

There will be  $7 \pm 1$  homework assignments spread out over the course of the semester. They will be due every  $\sim 2$  weeks. They will be posted on the course webpage/UNM Canvas. Homeworks are to be submitted either in class or online on UNM Canvas using the appropriate link provided there. Credit for late homeworks will drop by 15% for every day late within a week, and no credit thereafter.

## Final Project

Each student is expected to prepare a term paper and presentation on a topic they will have selected from a list I will provide. The presentations will take place near the end of the semester (sometime in the last two weeks) and can be performed in powerpoint, keynote, google slides, or a similar presentation software. The reports will be due at around the same time. A choice of papers and detailed instructions will be provided by the end of the first month of classes.

**Letter grades** will be awarded as follows:

95+%	A+
90-94%	A
87-89%	A-
83-86%	B+
78-82%	B
75-77%	B-
71-74%	C+
68-70%	C
65-67%	C-
62-64%	D+
58-61%	D
55-57%	D-
<55%	F

## Learning Goals

Upon successful completion of this course, students should be able to:

- Use physical principles to describe how stars and galaxies form and evolve over time.
- Learn and construct physical models of astronomical objects to explain observations.
- Apply the "scientific method" towards obtaining answers to (new) questions in the study of the interstellar medium, galaxies and the Universe.
- Analyse and evaluate selected peer reviewed journal articles; demonstrate an ability to recognise the important points and explain these to peers.
- Synthesize material from multiple sources, critically assess it and present it clearly and concisely in written and oral form.

## Academic Integrity

We all have shared responsibility for ensuring that learning occurs safely, honestly, and equitably. Submitting material as your own work that has been generated on a website, in a publication, by an artificial intelligence algorithm, by another person, or by breaking the rules of an assignment constitutes academic dishonesty. It is a student code of conduct violation that can lead to a disciplinary procedure. Please ask me for help in finding the resources you need to be successful in this course. I can help you use study resources responsibly and effectively. Off-campus paper writing services, problem-checkers and services, websites, and AIs can be incorrect or misleading. Learning the course material depends on completing and submitting your own work. UNM preserves and protects the integrity of the academic community through multiple policies including policies on student grievances (Faculty Handbook D175 and D176), academic dishonesty (FH D100), and respectful campus (FH C09). These are in the Student Pathfinder (<https://pathfinder.unm.edu>) and the Faculty Handbook (<https://handbook.unm.edu>).

## Land Acknowledgment

Founded in 1889, the University of New Mexico sits on the traditional homelands of the Pueblo of Sandia. The original peoples of New Mexico Pueblo, Navajo, and Apache since time immemorial, have deep connections to the land and have made significant contributions to the broader community statewide. We honor the land itself and those who remain stewards of this land throughout the generations and also acknowledge our committed relationship to Indigenous peoples. We gratefully recognize our history.

## Diversity and Inclusivity Statement

I consider this classroom to be a place where you will be treated with respect, and I welcome individuals of all ages, backgrounds, beliefs, ethnicities, genders, gender identities, gender expressions, national origins, religious affiliations, sexual orientations, ability - and other visible and non-visible differences. All members of this class are expected to contribute to a respectful, welcoming and inclusive environment for every other member of the class.

Citizenship and/or Immigration Status: All students are welcome in this class regardless of citizenship, residency, or immigration status. Your professor will respect your privacy if you choose to disclose your status. As for all students in the class, family emergency-related absences are normally excused with reasonable notice to the professor, as noted in the attendance guidelines above. UNM as an institution has made a core commitment to the success of all our students, including members of our undocumented community. The Administration's welcome is found on our [website](#).

## Title IX

Our classroom and our university should always be spaces of mutual respect, kindness, and support, without fear of discrimination, harassment, or violence. Should you ever need assistance or have concerns about incidents that violate this principle, please access the resources available to you on campus. Please note that, because UNM faculty, TAs, and GAs are considered "responsible employees" any disclosure of gender discrimination (including sexual harassment, sexual misconduct, and sexual violence) made to a faculty member, TA, or GA must be reported by that faculty member, TA, or GA to the university's Title IX coordinator. For more information on the campus policy regarding sexual misconduct and reporting, please see: .

## Accommodations

UNM is committed to providing equitable access to learning opportunities for students with documented disabilities. As your instructor, it is my objective to facilitate an inclusive classroom setting, in which students have full access and opportunity to participate. To engage in a confidential conversation about the process for requesting reasonable accommodations for this class and/or program, please contact Accessibility Resource Center at [arcsrvs@unm.edu](mailto:arcsrvs@unm.edu) or by phone at 505-277-3506.

If you need an accommodation based on how course requirements interact with the impact of a disability, you should contact me to arrange an appointment as soon as possible. At the appointment we can discuss the course format and requirements, anticipate the need for adjustments and explore potential accommodations. I rely on the [Accessibility Resource Center](#) for assistance in developing strategies and verifying accommodation needs.

## COVID-19 Symptoms and Positive Test Results

If you are experiencing COVID-19 symptoms, please do not come to class. If you have a positive COVID-19 test, please stay home for five days and isolate yourself from others, per the [Centers for Disease Control \(CDC\) guidelines](#). If you do need to stay home, please communicate with me at ; I can work with you to provide alternatives for course participation and completion. UNM faculty and staff know that these are challenging times. Please let me, an advisor, or another UNM staff member know that you need support so that we can connect you to the right resources. Please be aware that UNM will publish information on websites and email about any changes to our public health status and community response.