

Department of Astronomy and Planetary Science AST 210: Celebrating Diversity in Astronomy Spring 2023

Meeting Times

Tue & Thu 11:10 am — 12:25 pm
Liberal Arts, Rm 120

Instructor Contact & Availability

Professor: Dr. Lisa Chien (Lisa.Chien@nau.edu)

Email communications strongly preferred first, and please give me 24 hours to reply.
Office Hours: Mon & Wed 11:00 am — 12:00 pm, Bldg 19, Rm 311. We can also set up a Zoom meeting.

Teaching Assistant: Joey Green (jrg579@nau.edu)

Credit/ Pre- or co-requisites

3 credit hours, no pre- or co-requisites

Mode of Instruction

NAU is back fully **in-person** and we expect you to be in all classes for lectures, all discussions and exercises. We will use TopHat to make our large-enrollment lecture classes more interactive. TopHat is required, and there are questions for you to answer during the lecture classes. We will also have exercises in class to raise your self-awareness in EDIJ, or in astronomy topics. Group projects, one interview project and one infographic project, require you to actively work with your teammates, and we will have milestone assignments in class to help you make progresses.

Lecture content includes: 1) lectures with slides mixed with Youtube videos, 2) TopHat questions, 3) In-class exercises, 4) Guest speaker session reflections, and 5) Group project milestone assignments and presentations.

After Lecture content includes: 1) weekly reading assignments, 2) weekly reading quizzes, 3) Group projects working with your teammates, and 4) one final exam on BBLearn.

Course Purpose & Student Learning Outcome (SLO)

AST 210 is designed to help students develop an understanding of and greater familiarity with the cultural traditions and views of diverse people in astronomy (e.g. gender, race, ethnicity, sexual orientation diversities) and related sciences in general, and to help students develop appreciation of the scientific contributions and their greater impacts from these individuals. This course is an elective for all students at NAU, and it is (getting) approved as General Studies course in the **Scientific Literacy— Physical, Life, Earth, and Space Sciences** Knowledge Area and the **US Ethnic** Inclusive Perspectives, which provide students with an analytical framework that facilitates awareness of how cultures vary and shape human experience. This course will address several of the General Studies skills— *Critical Thinking, Information Literacy, Applications, Civil Discourse through Collaboration and Teamwork, Civil Discourse through Speaking, and Civil Discourse through Writing.*

This course is designed to be fully transparent, inclusive, and accessible to all students. The following Student Learning Outcomes (SLOs) will be addressed throughout the course, and by the end of the semester, students will:

SLO 1. Be able to explain historical and cultural background, barriers and biases, to access the field of science for people with a diverse identity or identities.

- SLO 2.** Be able to explain specific scientific advances made by people with one or more diverse identities and the influence of those scientific advances on their respective scientific fields and society overall.
- SLO 3.** Evaluate how influences of inequality, power and privilege affect participation in the science of astronomy, particularly to use intersectionality to address structural oppression/inequality how systems of oppressions mutually constitute, maintain and reinforce each other.
- SLO 4.** Develop an increased personal capacity to build connections between and within communities.

Required Materials & Technology

All reading materials and assessments are on TopHat and BBLearn course page. However, you need to have stable internet connection and reliable hardware in order to participate in-class TopHat Questions, and finish online final exam outside of classroom.



TopHat Course Code: 500236



Be sure to use SSO login. To Join TopHat for free, you can either go to my invitation email, click on the tab in our BBLearn, or simply click on the numbers above. For tablets and phones, download the app and use the join code.

Grading System & Late Policy

Assessment	Point Distribution	Total
TopHat Question	-	100
In-Class Exercise	8 x 5 pts	40
Reflection from Guest Speaker	8 x 5 pts	40
Reading Quiz	11 x 6 pts (1 lowest dropped)	60
Group Project 1 (cumulative)	4 x 10 pts + 60 pts for presentation	100
Group Project 2 (cumulative)	2 x 10 pts + 60 pts for infographic	80
Final Exam	-	80
Total		500

Grade	Total Score You Earned	
A	447	— 500
B	397	— 446
C	347	— 396
D	297	— 346
F	0	— 296

Late Submission Policy for all Assignments:

If you encounter any difficulties that hinder you from submitting your assignments promptly, first contact Dr. Chien as soon as you can. Please give me 24 hours to respond, and I may give you extensions depending on the situation. **Otherwise, late submissions for**

- **Group Project Milestone Assignments: 5 points deduction**
- **All other assignments: 2 points deduction per day**
- **Final Exam: zero**

Assignments & Assessments

1. TopHat Questions (SLO 1,2)

In each lecture class, there are about 10 questions based on the lectures. They are designed to increase interaction in class, and you can discuss with your classmates for most of the questions. They will be answered in class, and there will also be many extra participation points to earn. **No TopHat Questions points are dropped, and total is 100 points. These TopHat Questions are ideally answered in the class, but they will also be assigned due in 2 days from the lecture day.**

2. In-class Exercise (SLO 3, 4)

Every Thursday we will have an EDIJ exercise to raise your self-awareness and apply critical thinking to exam yourself. Scores for in-class exercises are based on completion, and not entirely on the content. **No Exercise points are dropped. There will be 8 exercises, with 5 points each, and the total is 40 points.**

Below is the detail of the Exercises:

	Exercise
#1	How Diverse Is Your Universe? SLO: To visually see the types of people you encounter in your daily life, raising your self awareness and perception to race and ethnicity.
#2	Whom to Leave Behind SLO: To raise your self awareness and perception to EDIJ, intersectionality, and stereotypes of people, culture, and science. Apply your critical thinking skill during the exercise.
#3	EDI in Introductory Astronomy & Physics Education SLO: To examine current Astronomy & Physics textbooks on the topic of EDI in science, and to explore possible ideas or methods to improve it through traditional education.
#4	A Girl Like Me SLO: To raise your self awareness and perception to race, gender, intersectionality, and stereotypes of people, education background and culture. Apply your critical thinking skill during the reflection.
#5	Understanding Privilege SLO: Sometimes we only look at areas that we are oppressed– wanting to focus on others’ power and responsibility to change the dynamic. However, it is not always “someone else’s” problem. So we want to take a little closer look at the privileges we may or may not hold.
#6	Implicit Bias Test SLO: To raise your self awareness and perception of implicit bias towards gender and science. Apply your critical thinking skill afterwards and exam your bias.
#7	Imposter Syndrome Survey SLO: To raise your self awareness and perception of imposter syndrome against your own achievement. Apply your critical thinking skill during and after the exercise.
#8	A Growth Mindset SLO: To exam ourselves whether we are practicing a growth mindset, and tips to how to incorporate this into our life.

3. Reflection from Guest Speaker (SLO 3, 4)

Throughout the semester on Thursdays we will also have local guest speakers of Astronomy or Planetary Science, with diverse backgrounds. To improve EDIJ in the field, we not only need to look and learn from the past but also see the current process and efforts, and plan for future improvements. These guest speakers provide a view from our local, and their personal, efforts and observations of the field. The assignment is one-page reflection from the guest speaker session, and the scores are also based on completion. **No Reflection points are dropped. There will be 8 exercises, with 5 points each, and the total is 40 points.**

4. Reading Quiz (SLO 1, 2)

Reading quizzes are posted on BBLearn, which will test students’ comprehension of the material covered in the assigned reading. You have 2 attempts, and the timer is set to 60 minutes. The highest grade is counted BEFORE

the due date, and you can review the correct answers after the due date. There will be 11 Reading Quizzes, each with 6 points. **One lowest Reading Quiz score is dropped, so total points are 60 points. Reading Quizzes are due the following Tuesdays, 11:59pm.**

Below is the list of Reading assignments and assigned week. They may subject to change depending on the progress of the course:

	Week	Reading/Video Assignments
#1	2	1. An Open Letter on Diversity in Education , Camp (2016), <i>Physics Today</i> 2. Science and Culture , Iaccarino (2003), <i>European Molecular Biology Organization Reports</i>
#2	3	1. Why Aren't More Theories Named After Women? Women's History in Physics , Parks (2020), <i>The Physics Teacher</i> 2. Diversity: Promoting New Perspectives , Tachibana (2012), <i>American Association of the Advancement of Science</i> website
#3	4	Beliefs About Intelligence , Ch2 of <i>Why So Few? An AAUW Report on Women in STEM</i> (2010), <i>American Association of University Women</i>
#4	5	Hidden Biases of Good People , Banaji (2020), an invited talk at Tory Burch Foundation Embrace Ambition Summit (2020) on YouTube
#5	6	Recommendations , Ch10 of <i>Why So Few? An AAUW Report on Women in STEM</i> (2010), <i>American Association of University Women</i>
#6	7	The Matthew Matilda Effect in Science , Rossiter (1993), published in <i>Social Studies of Science</i>
#7	11	Sisters of The Sun , deGrasse Tyson (2014), an episode in the <i>Cosmos: A Spacetime Odyssey</i> show on Fox Channel website
#8	12	Pick 4 clips (or the entire episode) in the NOVA: Black Hole Apocalypse (2018) videos on PBS website
#9	13	What The Nobels Are— And Aren't— Doing to Encourage Diversity , Gibney (2018), <i>Nature</i>
#10	14	Choose one: 1. Interview with Dr. Jane Rigby , the AAS Committee on Sexual-Orientation and Gender Minorities in Astronomy (2013), AAS website 2. Loving Sally Ride , Sofia & Hanson (2021), <i>NPR</i> website
#11	15	Choose one: 1. 7 Lessons From 'Hidden Figures', NASA Mathematician Katherine Johnson's Life And Career , Dumbaugh (2020), <i>The Conversation</i> website 2. Black Women Physicists in The Wake , Prescod-Weinstein (2017), <i>Medium</i> website 3. These Labs Are Remarkably Diverse— Here's Why They're Winning at Science , Powell (2018), <i>Nature</i>

5. Group Projects (SLO 3, 4)

There are two Group Projects, with a group of 5-6 students. The first project is an interview of a local or family STEM professional. The second project is constructing an infographic of an astronomer. Each group will first identify a shared identity in their group. This could be their gender identity, race or ethnic identity, sexual orientation, or some other axis of identity they choose to emphasize. ***The rule for the two projects is that one of the persons, the interviewee or the researched astronomer, must share the same identity as the group, and the other person must meaningfully differ from it.*** In this way, students will gain a deeper understanding of their personal identity, and learn about a different one. To support and scaffold the projects, we will have regular “milestone” assignments related to the projects. Milestone assignments will contribute to the overall cumulative grade of the term project.

I also understand that you may want to choose to work on the projects by yourself, under special circumstances, even though they are assigned as Group Projects. **Please contact me as soon as possible to inform me about your decision and preference.** I am accommodating and happy to work with you, however please try your best to work in a team, as **Teamwork** is one of the eight [Career-Ready Competencies recognized by NACE](#).

► **Group Project 1— An Interview of a STEM Professional:** Each group will choose their 3 top interviewees for their project. On Week 5, groups will be notified by the instructor who they should interview on their list so we will not have too many overlaps from our class. The interview should happen preferably in Week 6–7, and a presentation of the project by the entire group will happen in Week 8 and 10. The interview itself should be between 30–40 minutes, and should not last longer than 60 minutes. The format of the presentation is entirely up to the group, i.e. a video, slides, or a combination of both. The requirements are **1) 5–10 minutes of group presentation, and 2) preferably presented by everyone.** Earlier interviews are strongly recommended.

Below are the details of the **Interview Milestone Assignments:**

	Week	Format	Content
#1	3	Group, 1 page	1) Discuss and briefly describe a shared, meaningful identity in your group. 2) Describe any differences within this identity. 3) Describe how other axes of privilege/oppression affect this shared identity.
#2	4	Group, 1 page	1) Identify 3 local STEM person with a shared meaningful identity, or a different identity. Don't contact them yet! 2) Describe why the group wishes to interview this person. 3) Describe how this person shares, or is different from, the identity. 4) Submit at least 10 questions you intend to ask your interviewee.
#3	5	Group, 1 page	1) Once notified by the instructor, contact the professional to set up the interview whether in-person, with zoom, or a phone call. Request the interview to occur in Week 6 or 7, the latest Week 8 (if you're presenting on Week 10). 2) Turn in an interview plan: who will ask which specific questions, a plan for note taking or recording the interview. The group must ask the proposed questions which will be approved by the instructor.
#4	8 & 10	-	Presentation— make sure you consolidate any transcripts, notes, and/or recordings.
#5	11	Individual, 1 page	Create an outline for an essay synthesizing the course material and the interview with the local STEM professional, as well as a self review and a peer review.

► **Group Project 2— An Infographic of an Astronomer:** Each group will pick an astronomer, current or past, to research that is not reviewed in class and is different from the interviewee. **Keep in mind the rule for Group Projects.** For example, If the interviewee shared identities with the group, the group must choose an astronomer with a meaningfully different identity. If the interviewee had a meaningfully different identity, choose an astronomer with a similar identity.

Below are the details of the **Infographic Milestone Assignments:**

	Week	Format	Content
#1	13	Group, 1 page	1) Describe why the group wishes to research this astronomer. 2) Describe how this astronomer shares, or is different from, the identity in your group.
#2	15	Group, 1 page	1) Describe the most important take-away point about the group's astronomer. 2) Describe how the Infographic will deliver that message. 3) Submit at least 5 other sections/bullet points on the infographic.
#3	16	Group, 1 page	Your group can determine the size of this Infographic. Submit your group Infographic as a PDF or JPEG file.

6. Final Exam (SLO 1, 2)

There will be a final exam summarizing and consolidating the readings, lectures, and quizzes. You have 2 hours but only 1 attempt, open book and open notes. **It will be available on BBLearn from Tue, May 9, 6am to Thu, May 11, 12pm.** Please remember that every point counts, and there will be NO make up of any assignment nor extra credit work AFTER THE FINAL WEEK IS OVER. Please do NOT negotiate about points with me, since the points you earn should solely depend on your hard work throughout the semester.

Class Tentative Schedule

Week	Dates	Topic	Group Projects Due	Reading Quiz Due
1	1/17 1/19	No Class (Snow Day) Introduction to the course	-	-
2	1/24 1/26*	Overview of World History in Astronomy	(Groups formed)	-
3	1/31 2/2	Why so few? Women in STEM Report (2010)	Interview Assignment #1 (Group, 1 page)	#1: 1/31
4	2/7 2/9	NAU and National EDIJ efforts Maria Cunitz and Maria Kirch	Interview Assignment #2 (Group, 1 page)	#2: 2/7
5	2/14 2/16	Maria Clara Eimmart, Caroline Herschel, Planetary Scientist Guest: Prof. Devon Burr	Interview Assignment #3 (Group, 1 page)	#3: 2/14
6	2/21 2/23	Ada Lovelace, Maria Mitchell Astronomer Guest: Jasmine Garani	-	#4: 2/21
7	2/28 3/2	The Harvard Computers Astronomer Guest: Dr. Teddy Kareta	-	#5: 2/28
8	3/7 3/9	Interview Presentation (Interview Assignment #4)		#6: 3/7
9	Spring Break			
10	3/21 3/23*	Interview Presentation (Interview Assignment #4)		-
11	3/28 3/30	The Harvard Computers & Cecilia Payne-Gaposchkin Astronomer Guest: Dr. Jennifer Hanley	Interview Assignment #5 (Individual, 1 page)	-
12	4/4 4/6	Inge Lehmann, Marie Tharp, Vera Rubin, Black Hole Hunters (from PBS NOVA series) Planetary Scientist Guest: Cece Thieberger	-	#7: 4/4
13	4/11 4/13	Jocelyn Bell Burnell & Women in Nobel Prizes Astronomer Guest: Shih-Yun Tang	Infographic Assignment #1 (Group, 1 page)	#8: 4/11
14	4/18 4/20	Frank Kameny, James Pollack, Jane Rigby, Sally Ride Astronomer Guest: Prof. Cristina Thomas	-	#9: 4/18
15	4/25 4/27	Mae Jamison, Ed Dwight Jr., & Minority Astronauts Planetary Scientist Guest: Schuyler Borges	Infographic Assignment #2 (Group, 1 page)	#10: 4/25
16	5/2 5/4	The Hidden Figures, Nancy Roman, Norton vs Macy, and the Controversy of JWST	-	#11: 5/2
	5/5 Fri	Infographics (Infographic Assignment #3) DUE		
17	Final Exam: Tue, May 9, 6:00am to Thu, May 11, 12:00pm on BBLearn			

*1/26: Last Day to Add/Drop, 3/24: Last Day to Withdraw

Academic Deadlines

- ADD/DROP deadline (without “W”): 1/26
- Last day to withdraw: 3/24

Respect for Diversity

It is my intent that students from all diverse backgrounds and perspectives be well served by this course, that students’ learning needs be addressed both in and out of class, and that the diversity that students bring to this class be viewed as a resource, strength and benefit. It is my intent to present materials and activities that are respectful of diversity: gender, sexuality, disability, age, socioeconomic status, ethnicity, race, and culture. Your suggestions are encouraged and appreciated. Please let me know ways to improve the effectiveness of the course for you personally or for other students or student groups. In addition, if any of our class meetings conflict with your religious events, please let me know so that we can make arrangements for you. I am NAU Safe Zone certified.

COVID-19 REQUIREMENTS AND INFORMATION

Additional information about the University’s response to COVID-19 is available from the **Jacks are Back!** web page located at <https://nau.edu/jacks-are-back>.

Syllabus Policy Statements

ACADEMIC INTEGRITY

NAU expects every student to firmly adhere to a strong ethical code of academic integrity in all their scholarly pursuits. The primary attributes of academic integrity are honesty, trustworthiness, fairness, and responsibility. As a student, you are expected to submit original work while giving proper credit to other people’s ideas or contributions. Acting with academic integrity means completing your assignments independently while truthfully acknowledging all sources of information, or collaboration with others when appropriate. When you submit your work, you are implicitly declaring that the work is your own. Academic integrity is expected not only during formal coursework, but in all your relationships or interactions that are connected to the educational enterprise. All forms of academic deceit such as plagiarism, cheating, collusion, falsification or fabrication of results or records, permitting your work to be submitted by another, or inappropriately recycling your own work from one class to another, constitute academic misconduct that may result in serious disciplinary consequences. All students and faculty members are responsible for reporting suspected instances of academic misconduct. All students are encouraged to complete NAU’s online academic integrity workshop available in the E-Learning Center and should review the full *Academic Integrity* policy available at <https://policy.nau.edu/policy/policy.aspx?num=100601>.

COPYRIGHT INFRINGEMENT

All lectures and course materials, including but not limited to exams, quizzes, study outlines, and similar materials are protected by copyright. These materials may not be shared, uploaded, distributed, reproduced, or publicly displayed without the express written permission of NAU. Sharing materials on websites such as Course Hero, Chegg, or related websites is considered copyright infringement subject to United States Copyright Law and a violation of NAU Student Code of Conduct. For additional information on ABOR policies relating to course materials, please refer to ABOR Policy 6-908 A(2)(5).

COURSE TIME COMMITMENT

Pursuant to Arizona Board of Regents guidance (ABOR Policy 2-224, *Academic Credit*), each unit of credit requires a minimum of 45 hours of work by students, including but not limited to, class time, preparation, homework, and studying. For example, for a 3-credit course a student should expect to work at least 8.5 hours each week in a 16-week session and a minimum of 33 hours per week for a 3-credit course in a 4-week session.

DISRUPTIVE BEHAVIOR

Membership in NAU’s academic community entails a special obligation to maintain class environments that are conducive to learning, whether instruction is taking place in the classroom, a laboratory or clinical setting, during course-related fieldwork, or online. Students have the obligation to engage in the educational process in a manner that does not interfere with normal class activities or violate the rights of others. Instructors have the authority and responsibility to address disruptive behavior that interferes with student learning, which can include the involuntary withdrawal of a student from a course with a grade of “W”. For additional information, see NAU’s *Disruptive Behavior in an Instructional Setting* policy at <https://nau.edu/university-policy-library/disruptive-behavior>.

NONDISCRIMINATION AND ANTI-HARASSMENT

NAU prohibits discrimination and harassment based on sex, gender, gender identity, race, color, age, national origin, religion, sexual orientation, disability, veteran status and genetic information. Certain consensual amorous or sexual relationships between faculty and students are also prohibited as set forth in the *Consensual Romantic and Sexual Relationships* policy. The Equity and Access Office (EAO) responds to complaints regarding discrimination and harassment that fall under NAU’s

Nondiscrimination and Anti-Harassment policy. EAO also assists with religious accommodations. For additional information about nondiscrimination or anti-harassment or to file a complaint, contact EAO located in Old Main (building 10), Room 113, PO Box 4083, Flagstaff, AZ 86011, or by phone at 928-523-3312 (TTY: 928-523-1006), fax at 928-523-9977, email at equityandaccess@nau.edu, or visit the EAO website at <https://nau.edu/equity-and-access>.

TITLE IX

Title IX of the Education Amendments of 1972, as amended, protects individuals from discrimination based on sex in any educational program or activity operated by recipients of federal financial assistance. In accordance with Title IX, Northern Arizona University prohibits discrimination based on sex or gender in all its programs or activities. Sex discrimination includes sexual harassment, sexual assault, relationship violence, and stalking. NAU does not discriminate on the basis of sex in the education programs or activities that it operates, including in admission and employment. NAU is committed to providing an environment free from discrimination based on sex or gender and provides a number of supportive measures that assist students, faculty, and staff.

One may direct inquiries concerning the application of Title IX to either or both the Title IX Coordinator or the U.S. Department of Education, Assistant Secretary, Office of Civil Rights. You may contact the Title IX Coordinator in the Office for the Resolution of Sexual Misconduct by phone at 928-523-5434, by fax at 928-523-0640, or by email at titleix@nau.edu. In furtherance of its Title IX obligations, NAU promptly will investigate or equitably resolve all reports of sex or gender-based discrimination, harassment, or sexual misconduct and will eliminate any hostile environment as defined by law. The Office for the Resolution of Sexual Misconduct (ORSM): Title IX Institutional Compliance, Prevention & Response addresses matters that fall under the university's Sexual Misconduct policy. Additional important information and related resources, including how to request immediate help or confidential support following an act of sexual violence, is available at <https://in.nau.edu/title-ix>.

ACCESSIBILITY

Professional disability specialists are available at Disability Resources to facilitate a range of academic support services and accommodations for students with disabilities. If you have a documented disability, you can request assistance by contacting Disability Resources at 928-523-8773 (voice), 928-523-8747 (fax), or dr@nau.edu (e-mail). Once eligibility has been determined, students register with Disability Resources every semester to activate their approved accommodations. Although a student may request an accommodation at any time, it is best to initiate the application process at least four weeks before a student wishes to receive an accommodation. Students may begin the accommodation process by submitting a self-identification form online at <https://nau.edu/disability-resources/student-eligibility-process> or by contacting Disability Resources. The Director of Disability Resources, Jamie Axelrod, serves as NAU's Americans with Disabilities Act Coordinator and Section 504 Compliance Officer. He can be reached at jamie.axelrod@nau.edu.

RESPONSIBLE CONDUCT OF RESEARCH

Students who engage in research at NAU must receive appropriate Responsible Conduct of Research (RCR) training. This instruction is designed to help ensure proper awareness and application of well-established professional norms and ethical principles related to the performance of all scientific research activities. More information regarding RCR training is available at <https://nau.edu/research/compliance/research-integrity>.

MISCONDUCT IN RESEARCH

As noted, NAU expects every student to firmly adhere to a strong code of academic integrity in all their scholarly pursuits. This includes avoiding fabrication, falsification, or plagiarism when conducting research or reporting research results. Engaging in research misconduct may result in serious disciplinary consequences. Students must also report any suspected or actual instances of research misconduct of which they become aware. Allegations of research misconduct should be reported to your instructor or the University's Research Integrity Officer, Dr. David Faguy, who can be reached at david.faguy@nau.edu or 928-523-6117. More information about misconduct in research is available at <https://nau.edu/university-policy-library/misconduct-in-research>.

SENSITIVE COURSE MATERIALS

University education aims to expand student understanding and awareness. Thus, it necessarily involves engagement with a wide range of information, ideas, and creative representations. In their college studies, students can expect to encounter and to critically appraise materials that may differ from and perhaps challenge familiar understandings, ideas, and beliefs. Students are encouraged to discuss these matters with faculty.

“Education is the most powerful weapon which we can use to change the world.” — Nelson Mandela