

## Department of Astronomy and Planetary Science

# AST 399 Special Topics: Communication in Astronomy

## Spring 2024

### Course Information

- Meeting Times & Location: Tue & Thu, 2:20 — 3:10 pm, Rm. 202
- Credit: 2 credit hours
- Instructor & Email: Dr. Lisa Chien ([Lisa.Chien@nau.edu](mailto:Lisa.Chien@nau.edu))
- Office Location: Bldg. 19, Rm. 225C
- Office Hours: MW 10 — 11 am
- Teaching Assistant: Kayla Blair ([kpb228@nau.edu](mailto:kpb228@nau.edu))
- This course is part of the [NAU Course-based Undergraduate Research Experience \(CURE\)](#) pilot courses in Spring 2024

### Course Prerequisites

No pre- or co-requisites

### Mode of Instruction

We expect students to be fully **in-person** in each class. There will be short instructor presentations, guest speaker sessions, and plenty of interaction and discussion sessions in class. **Attendance is HIGHLY recommended**, and 3 or more absences will affect students' final grades as described below (see Grading System).

### Course Description, Student Learning Objectives (SLOs), & Structure

From recent developments in politics and social/digital media, Science Communication is more important than ever. It is such an important ability for our future scientists, and science/STEM advocates in general, to discuss science properly, correctly, and patiently, using a variety of methods, technologies, and languages at all levels. In many current NAU courses, communication skills are expected to be incorporated, and students are also encouraged to practice communication through presentations or campus-wide symposiums. These general approaches are somewhat effective, however, this course aims to help students develop specific skills as well as further address the importance and the need for science communication. The process of communication requires lots of careful planning— learning and understanding the audience's background; hypothesizing, or formulating, the best methods and proper languages to use; executing the most appropriate and correct style of communication; and finally if not well-received, evaluating the methods and languages used and trying it again. In some ways, this process is very much a scientific research process, and the goal of training our students to think critically, with this scientific process, in this course aligns perfectly with the key elements of the CURE.

At the end of this course, students should be able to:

- SLO1.** learn the essence of research steps through communication in science;
- SLO2.** communicate astronomy/science with various creative and engaging methods;
- SLO3.** explain (complex and advanced) topics in astronomy/science to a general audience effectively;
- SLO4.** critique the importance of good astronomy/science communication;
- SLO5.** practice inclusive and accessible astronomy/science communications.

### NACE Career Readiness Competencies

The [National Association of Colleges and Employers \(NACE\)](#), the leading source of information on the employment of the college-educated, has identified eight [Career Readiness Competencies \(CRC\)](#), a foundation from which to demonstrate requisite core competencies that broadly prepare the college-educated for success in the workplace and lifelong career management. In this course, several of the CRCs are identified to be aligned with the assignments.

1. **Career & Self-Development:** Proactively develop oneself and one's career through continual personal and professional learning; awareness of one's strengths and weaknesses
2. **Communication:** Clearly and effectively exchange information, ideas, facts, and perspectives with personnel inside and outside of an organization
3. **Critical Thinking:** Identify and respond to needs based upon an understanding of situational context and logical analysis of relevant information
4. **Equity & Inclusion:** Demonstrate the awareness, attitude, knowledge, and skills required to equitably engage and include people from different local and global cultures.
5. **Leadership:** Recognize and capitalize on personal and team strengths to achieve organizational goals.
6. **Professionalism:** Knowing work environments differ greatly, understand and demonstrate effective work habits, and act in the interest of the larger community and workplace
7. **Teamwork:** Build and maintain collaborative relationships to work effectively toward common goals, while appreciating diverse viewpoints and shared responsibilities
8. **Technology:** Understand and leverage technologies ethically to enhance efficiencies, complete tasks, and accomplish goals

### NAU Career Ready Resources

- LinkedIn:
  - CEFNS Career Development [www.linkedin.com/in/cefns-career-development-072715233](http://www.linkedin.com/in/cefns-career-development-072715233)
  - NAU Career Development <https://www.linkedin.com/company/nau-career-development/>
- Handshake: <https://nau.joinhandshake.com/login>
- Udemy: Online courses and career searching advice <https://in.nau.edu/its/udemy/>  
(Log in with your NAU email account and search 'NAU Career Steps')
- O\*net Online: Occupation exploration reports <https://www.onetonline.org/>

### Required Materials & Technology

Readings, videos, and resources will be provided and discussed in class.

### Evaluation & Grading System

Absences	Effect on grade
≤ 3	None
4 — 6	Lowered by 5%
≥ 7	Lowered by 10%

Assessment	Points
Oral Practices	<b>23</b>
Written Practices	<b>20</b>
Activities & Public Engagements	<b>17</b>
<b>Total</b>	<b>60</b>

Grade	Points
A	53 and more
B	47 to 52
C	41 to 46
D	35 to 40
F	34 and lower

There are **3 different kinds of assessment** for this class, designed to help students build various communication skills. There will also be **plenty of public engagement opportunities**, at different locations and with different audiences, for students to participate. In addition, **guest speakers** will also be scheduled throughout the semester. There will also be a **CURE Student Post-Assessment** for students. Below are tables of assignments and points, along with the aligned SLOs and CRCs.

## Oral Practices

	SLO	CRC	Topic	Points
<b>Elevator Speech</b>	1, 2	Critical Thinking Equity & Inclusion	1. Astronomy 2. Challenges in Astronomy 3. EDIJ in Astronomy/STEM	3
<b>Interview &amp; Video Presentation</b>	3	Career & Self-Development Professionalism	Interview an Astronomer/Planetary Scientist	5
<b>Presentation</b>	1, 3	Career & Self-Development Equity & Inclusion Professionalism	Astronomy	5
<b>Class Debate</b>	3, 4	Critical Thinking Equity & Inclusion Leadership Professionalism Teamwork	1. Challenges in Astronomy (week 11) 2. Style vs Substance (week 15)	10
				<b>23</b>

## Written Practices

	SLO	CRC	Topic	Points
<b>250-word Abstract</b>	1, 2	Critical Thinking Equity & Inclusion Technology	1. Astronomy 2. Challenges in Astronomy 3. EDIJ in Astronomy/STEM	3
<b>Professional Article/ Blog</b>	1, 3	Career & Self-Development Critical Thinking Professionalism Technology	Astronomy	5
<b>Weekly Reflection</b>	4, 5	Critical Thinking Professionalism	Weekly topic review for 12 weeks	12
				<b>20</b>

## Activities & Public Engagements

	SLO	CRC	Topic	Points
<b>Discussion</b>	1, 4, 5	Career & Self-Development Critical Thinking Equity & Inclusion Leadership Professionalism	1. How to Recharge 2. How to Sustain the Science Communication 3. Creative Ways for Science Communication 4. Careers in Science Communication 5. EDIJ Scenarios 6. Portraits of Astronomers/Scientists in Media And more	8
<b>Accessibility Practices</b>	5	Equity & Inclusion Professionalism Technology	1. In-person settings 2. Digital settings	2
<b>Community Outreach</b>	2, 3, 5	Career & Self-Development Critical Thinking Equity & Inclusion Leadership Professionalism Teamwork	1. Weekly Friday Evenings at BLT (individual/pair) 2. Shadowing an Educator at the Lowell Observatory (individual/pair) 3. Trip to Navajo & Hopi Schools with the Lowell Observatory Native American Outreach Program (individual/pair) 4. Flagstaff Festival of Science Events in April (all)	7
				<b>17</b>

### Oral Practices

These practices include **elevator speeches**, an **interview** session, **presentations**, and group **debates**. We will focus on 3 main themes throughout this course— Astronomy, challenging or controversial topics, and EDIJ (equity, diversity, inclusion, and justice) issues or topics in the field. The format of each practice is:

- **Elevator speech:** Students will be given 1 to 3 minutes to speak in class and convey their messages about the topic. There will be peer reviews in class, assessing on 1) clear descriptions, 2) new knowledge, and 3) effectiveness.
- **Interview:** Interview an astronomer or a planetary scientist in town. Learn about their research and their outreach activities. Summarize and make a short video presentation to be posted to Dept. Facebook or website.
- **Presentation:** Formal style presentation, as in professional conferences, focusing on the assigned topics. There will also be peer reviews and feedback. Students may use any aids for their presentations.
- **Class debate:** The class will be divided into 2 groups debating on two topics: Challenges in Astronomy, and Style vs Substance, with specific details determined in class. Teamwork and communication with the group are necessary to be successful. There will be faculty participating and providing feedback.

### Written Practices

These practices include **250-word abstracts**, **professional articles or blogs**, and **weekly reflections**. We will focus on the same 3 main themes throughout this course for practice. The details of each practice are as follows:

- **250-word abstract:** Students will summarize their message into only 250 words as a science teaser. We will use a format of *writer and editor pair*, and peer review will focus on giving feedback on the teaser's 1) engagement, 2) clarity, 3) importance, and 4) effectiveness.
- **Professional article or blog:** We will have a course online platform (*ie.* Facebook and Dept. websites) and students are required to submit an official article to be published on the platform. We will track feedback through these platforms. Students are also required to submit an annotated bibliography with their references.
- **Weekly Reflections:** Twelve small written assignments about reflections on the discussions in class.

### Activities & Public Engagements

These practices include **discussions in class**, **accessibility practices**, and **community outreach** events. We will focus on the same 3 main themes throughout this course for practice. The details of each practice are as follows:

- **Discussion:** This course requires constant participation and discussions in class. There will be activities, worksheets, and group work times in class. There will also be guest speakers in class and Q&A sessions.
- **Accessibility practice:** There will be activities and discussions about the best practices for making the content and communication inclusive and accessible.
- **Community outreach:** There will be community outreach events scheduled, in town or Navajo or Hopi Nation, and open for participation so students can practice their skills in communicating to the public. We will use a format of *presenter and observer pair* for most of these outreach events. Creative outreach methods will also be discussed in class and encouraged for students to try.

## Tentative Schedule

Week	Topic	Assessment
1	Welcome week	
2	Introduction to Science Communication: Facts, Creativity, & Methods <b>Guest Speaker: Prof. Peter Frederichi</b>	250-word Abstract: Astronomy
3	The Importance of Science Communication: Goals & Motivation	Elevator Speech: Astronomy
4	Knowing Your Audience: Engagement & Connection <b>Guest Speaker: Ms. Elizabeth Vogler</b>	Professional Article/Blog: Astronomy
5	Presentation: Astronomy	
6	The Power of Stories: Elements of Storytelling <b>Guest Speaker: Prof. Cristina Thomas</b>	
7	Presenting Students Story: Body Language, Tone & Pace, Digital Tools	Interview Video Presentation
8	Science Communication Challenges: Facts, Misperceptions, & Media <b>Guest Speaker: Prof. Chad Trujillo</b>	250-word Abstract: Challenges in Astronomy
10	Science Communication Challenges: Science & Culture	Elevator Speech: Challenges in Astronomy
11	Class Debate: Challenges in Astronomy	
12	The Future of Inclusive Science Communication: EDIJ & Accessibility	
13	The Future of Inclusive Science Communication: Indigenous & Cultural Representation <b>Guest Speaker: Ms. Alethia Little</b>	250-word Abstract: EDIJ in Astronomy
14	Science Communication Careers & Future Space Laws <b>Guest Speaker: Ms. Nena Bloom &amp; Ms. Lauren Shollenberger</b>	Elevator Speech: EDIJ in Astronomy
15	Class Debate: Style vs Substance	
16	Wrap up week	

## 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 students 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 students. I am NAU Safe Zone certified.

## University Policies

- [Academic Integrity Policy](#): Simply two words— no tolerance. *All students* involved will receive zero points on that assignment or exam. If cheating/plagiarism continue, students will receive an F in the class and the Dean's office will be notified.
- [Student Institutional Excuses Policy](#): Also see the [Faculty Notification Request form](#) if students must miss classes.