

AST 399 – Communication in Astronomy

Spring 2025

Course Information

- Location: Wettaw/Bio-Chem Rm 242
- Meeting time: T/Th 2:20-3:35 pm
- Total Units of Course Credit: 3
- Prerequisites: none

Instructor Information

- Instructor: Prof. Jonathan Jackson
- Email: jonathan.jackson@nau.edu
- Office: Physical Sciences Rm 225A
- Student Hours: W 2:30-3:30 pm

Course Description

In the age of information and disinformation, science communication skills are more important than ever. While these skills are not often prioritized in science curricula, they serve a vital role in allowing our science to reach our peers and the public. The goal of this course is to provide a focused environment for students to learn and practice scientific reading, writing, and presentation. We will consider multiple audiences and perspectives and discuss the best practices for getting our messages across. Perhaps more importantly, we will practice giving and receiving critical feedback to develop the infrastructure to continue improving our communication skills into the future. This class will work through the lens of astronomy, but the skills developed will be extendable to all STEM fields.

Student Learning Objectives

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

SLO1. Efficiently read scientific writing and extract the most significant information;

SLO2. Write scientific content appropriate for a variety of different audiences;

SLO3. Creatively and effectively communicate scientific research through oral presentation;

SLO4. Provide and accept constructive criticism on communication practices;

SLO5. Collaborate with other scientists at each stage of the scientific method;

SLO6. Consider and discuss accessibility and equity in the world of astronomy.

100% Career Ready

One of the primary goals of this course is to provide skills that are in-demand from STEM employees to help NAU CEFNS students pursue careers of confidence and lives or purpose. Below is a list of in-demand career-ready competencies (CRC) from the

National Association of Colleges and Employers (NACE) that students may be able to practice in this course:

CRC1. Career & Self-Development: Proactively develop oneself and one's career through continual personal and professional learning, awareness of one's strengths and weaknesses, navigation of career opportunities, and networking to build relationships within and without one's organization.

CRC2. Communication: Clearly and effectively exchange information, ideas, facts, and perspectives with persons inside and outside of an organization.

CRC3. Critical Thinking: Identify and respond to needs based upon an understanding of situational context and logical analysis of relevant information.

CRC4. Equity & Inclusion: Demonstrate the awareness, attitude, knowledge, and skills required to equitably engage and include people from different local and global cultures. Engage in anti-racist practices that actively challenge the systems, structures, and policies of racism.

CRC5. Leadership: Recognize and capitalize on personal and team strengths to achieve organizational goals.

CRC6. Professionalism: Knowing work environments differ greatly, understand and demonstrate effective work habits, and act in the interest of the larger community and workplace.

CRC7. Teamwork: Build and maintain collaborative relationships to work effectively toward common goals, while appreciating diverse viewpoints and shared responsibilities.

CRC8. Technology: Understand and leverage technologies ethically to enhance efficiencies, complete tasks, and accomplish goals.

The Career-Ready Competencies most directly covered in this class are: CRCs 1, 2, 3, 4, 5, 6, and 7.

Textbook and Materials

There is no required textbook for this class, but *Writing Science in Plain English*, by Anne E. Greene is recommended, as many of our class discussion topics are covered within. Students may also benefit from *They Say / I Say*, by Gerald Graff and Cathy Birkenstein.

Evaluation and Grading System

Students in this class will be assessed through a series of written and oral assignments, in addition to attendance and participation in class. The tables below describe how each assignment will go into the grade book and the total points required to earn each letter grade:

Assessment	Points
Participation	20
Discussion Forum	20
Astrobites Paper	30
Press Release	20
Research Paper	30
In-class Presentation	30
Total	150

Absences	Effect on grade
0 – 3	None
4 – 6	Lowered by 5%
7 or more	Lowered by 10%

Grade	Points
A	135 – 150
B	120 – 134
C	105 – 119
D	90 – 104
F	0 – 89

Attendance and Participation

- Science is a collaborative effort. We will emulate this process in our class through discussions, activities, and debates. Moreover, the foundation for many of the skills we will develop throughout the semester will begin in class. For this reason, class attendance and active participation will both contribute to your grade.
- If you need to miss a class, please reach out to Professor Jackson *in advance* so that an accommodation can be reached regarding any missed activities.
- Your participation grade may also incorporate some prep work outside of class, such as reading assignments.

Discussion Forum

- Weekly discussion questions will be posted on Canvas for the class to engage with. These discussions are meant to be interactive so that we can all learn from each other – just responding to the prompt without interacting with your classmates’ answers will not result in full credit.

Written assignments

- There will be three large written assignments in this class, each with a different audience in mind. The assignments will be modular, meaning preparation steps like abstracts and outlines will contribute to the overall assignment grade. Each assignment is briefly described below:
 - **Astrobites paper** – This will be a group assignment to summarize a published journal article in the field of Astronomy in the style of an [Astrobites](#) article. The intended audience is fellow STEM undergraduates.
 - **Press Release** – This will be another effort to summarize a research article, but in the style of a news press release. The intended audience is the general public.
 - **Research Paper** – This will be an individual research paper in the style of a professional journal article. The intended audience is other scientists.
- **Late assignments will be accepted only with prior permission.** You may ask for a 2-extension with no questions asked! For longer extensions, please communicate the reason for the extension in your request.

Oral Assignments

- The course will culminate in oral presentation from each student on an astronomy topic of their choosing. Along the way, however, there will be several smaller oral practices that will contribute to the preparation for these presentations, including practice talks reviewed by your peers.

University Policies

- **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://www9.nau.edu/policies/Client/Details/1443?whoIsLooking=Students&pertainsTo=All>
- **ARTIFICIAL INTELLIGENCE:** Artificial intelligence (AI) technologies bring both opportunities and challenges. Ensuring honesty in academic work creates a culture of integrity and expectations of ethical behavior. The use of these technologies can depend on the instructional setting, varying by faculty member, program, course, and assignment. Please refer to course policies, any additional course-specific guidelines in the syllabus, or communicate with the instructor to understand expectations. NAU recognizes the role that these technologies will play in the current and future careers of our graduates and expects students to practice responsible and ethical use of AI technologies to assist with learning within the confines of course policies.
- **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. To report a concern related to possible unlawful discrimination or harassment or to request a time to meet, please use the [Report an Issue Form](#). To file a complaint, please submit the online [Complaint Form](#). EAO also assists with religious accommodations. To request a religious accommodation, please use the [Religious Accommodation Request Intake Form](#). EAO additionally provides access to lactation spaces, and please use to the [Lactation Space Request Form](#) to request use of a location. For additional information about nondiscrimination or anti-harassment, contact EAO at EquityandAccess@nau.edu, or visit the EAO website at <https://nau.edu/equity-and-access>. The EAO is located in Old Main on the first floor.
- **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 employees, and covered guests. One may direct inquiries concerning the application of Title IX to either or both the university Title IX Coordinator or the U.S. Department of Education, Assistant Secretary, Office of Civil Rights. You may contact NAU's Title IX Coordinator at titleix@nau.edu or by phone at 928-523-5434 . In furtherance of its Title IX obligations, NAU promptly will investigate or equitably resolve all reports of sex/gender-based discrimination, harassment, or sexual misconduct and will eliminate any hostile environment as defined by law. To submit a report, please use the [File a Report Form](#). 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](#). ORSM also facilitates reasonable modifications for pregnant or parenting individuals. Additional important information and related resources, including how to request help or confidential support following conduct covered by the Sexual Misconduct Policy, is available on the [ORSM web site](#), and you also may contact the office at titleix@nau.edu. The ORSM is located in Gammage on the third floor.

- **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, Scott Pryor, who can be reached at scott.pryor@nau.edu or 928-523-5927. 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.

Tentative Course Schedule

Week	Date	Topic	Discussion/Activity	Guest Lecture	Assignment Due	
1	1/14	Welcome Week	Introductions			
	1/16		Discussion: Mindsets			
2	1/21	Reading Science				
	1/23		Activity: Finding Sources			
3	1/28		Activity: Group Paper Reading			
	1/30			Prof. David Trilling		
4	2/4	Writing Science		Dr. Jennifer Hanley		
	2/6		Discussion: Why Write?		Astrobites Paper Outline	
5	2/11		Discussion: Fear of Writing	Prof. Mark Loeffler		
	2/13		Activity: Peer Review			
6	2/18			Prof. Mark Salvatore		
	2/20		Activity: Working With Data		Astrobites Paper	
7	2/25	Presenting Science		Rebecca Carmack		
	2/27		Activity: Timing		Talk Abstract	
8	3/4					
	3/6		Discussion: Media Literacy		Press Release	
	3/11	SPRING BREAK – NO CLASS				
	3/13					
9	3/18	Presenting Science	Activity: Elevator Talks			
	3/20					
10	3/25		Practice Presentations			
	3/27		Practice Presentations		Research Paper Abstract	
11	4/1		Practice Presentations			
	4/3		*No Class*	Professor Jackson’s Colloquium – Replaces Class	Research Paper Outline	
12	4/8		Discussion: Colloquium Review			
	4/10			Gavin Moriarty		
13	4/15	Final Oral Presentations				
	4/17				Research Paper Draft	
14	4/22	Accessibility and Ethics in Astronomy				
	4/24			Cece Thieberger		
15	4/29		Activity: Plan a Conference			
	5/1		Debate: Data Release			
16	5/6	FINALS WEEK – NO CLASS				
	5/8					Final Research Paper