

AST 596: Planetary Analogs Field Course

College of the Environment, Forestry, and Natural Sciences
Department of Astronomy and Planetary Science



College of the
Environment, Forestry,
and Natural Sciences

Semester: Fall 2024
Prerequisites: None
Location: Physical Sciences Bldg. (#19), Rm. 218
Meeting Time & Format: Meet weekly (Class Wed 3:00-3:50 pm), one field trip.
Instructors: Dr. Christopher Edwards, christopher.edwards@nau.edu, (928) 523-7234
Office Location: 205 Physical Sciences Bldg. (#19)
Office Hours: By Appointment Only

Course Purpose

This course will focus on a variety of field sites relevant for understanding planetary processes and interpretation of data from our solar system. Each field site, which will rotate on every offering, will be designed to provide specific insight into a process, formation mechanism, geologic expression or remote sensing technique that has direct relevance for planetary science investigations. Particular emphasis will be placed on student-led field plans, where students will develop a thorough understanding of the field site, lead the field trip and develop assignments. This class is **Pass/Fail** in format.

Course Description

The use of field sites as a proxy for understanding planetary surface processes is a tried and true methodology in planetary science. We use these well-chosen, unique field sites to illuminate processes, formation, and resulting alteration of planetary surfaces where they can be more easily studied on Earth. Many different planetary analog field sites are available within a day's drive of Northern Arizona University. Prior to the start of the semester, the lead faculty will select a site and goal from a set of well-documented field sites which could investigate volcanos, impact craters, sedimentary layered deposits, channels, sapping features, lava flows, etc. In addition, the style of field trip may be variable where students will create field guide, science implementation plan, or other products.

In this class, we will work to understand field sites that have long remained enigmatic in terms of their origins, and associated hypotheses. Students will:

- (1) *Evaluate the current state of understanding of the field site.*
- (2) *Present hypotheses for the formation to the class in small groups.*
- (3) *Determine areas where measurements could be made to help assess the aforementioned formation hypotheses to be presented at the end of the course.*

Students will break up into small teams, with each team working together to present the literature review, work together in the field, and final debrief.

Course Objectives & Learning Outcomes

The primary objectives of this course are to develop an understanding of the translation of planetary analog literature from in-class discussion to in-field practice.

By the end of the semester, students will be able to:

- Summarize the current state of the literature of a given field site by formally presenting materials to the class and fielding questions from the professor and classmates
- Update interpretations from field-based experiences and observations
- Critically discuss literature in light of new observations made from field-based experiences

Assessment

This is a PASS/FAIL course. Course assessment will include the following:

- **Literature Review (30%)**: Groups will prepare for and lead a discussion of a key paper(s) from the field area. This should include a simple visual presentation of key figures & take home messages (deliverable) along with a discussion of figures, findings and how they may affect the field guide and/or interpretations of the field sites.
- **In Field Participation (30%)**: Students will make observations and discuss these observations in the field within their team and other teams. These discussions will be used in the final debrief where they will present the findings and interpretations in the context of the background literature to the class.
- **Final Debrief (40%)**: Students will participate in a round-table discussion where they reflect on their field experience, emphasizing their group's topic of interest, their observations in the field, and their synthesis of all available data, observations, and reviews. Each student is expected to contribute to this final discussion. Groups will be evaluated on the clarity of the discussion, the clear and well-defined contributions of each team member, and the ability to link and associate the literature review with the questions addressed in the field, and to the relevant field data and remote sensing measurements.

Assignments will be evaluated by Edwards, and possible guest assessors. Grading/assessment criteria will be provided prior to each assignment. A passing grade is $\geq 65\%$ while a failing grade is $< 65\%$.

Required Materials & Technology: None.

Class, Departmental, & University Policies

- As a courtesy to the instructors and to your fellow students, please come to class on time.
- Please refrain from any other "electronic distractions" (e.g., answering emails, text messaging, browsing social media) during class. If you are anticipating disruptions during class for any personal or professional reasons, please notify the professors prior to class.
- Please disclose any disabilities or special requirements to the NAU Disabilities Resources Office (DR.Registration@nau.edu, (928) 523-8773), who will contact the instructors privately regarding any accommodations.
- Neither audio or video recording will be permitted except under special circumstances prescribed by the NAU Disability Resources Office or discussed with the professor prior to class.

NACE Career Readiness Competencies

The National Association of Colleges and Employers (NACE), the leading source of information on the employment of the college educated, have 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. The CRCs are identified to be aligned to 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 persons 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. **Professionalism**: Knowing work environments differ greatly understand and demonstrate effective work habits, and act in the interest of the larger community and workplace

6. Teamwork: Build and maintain collaborative relationships to work effectively toward common goals, while appreciating diverse viewpoints and shared responsibilities
7. Technology: Understand and leverage technologies ethically to enhance efficiencies, complete tasks, and accomplish goals

Career Ready Resources:

LinkedIn:

CEFNS Career Development

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/>

Class Schedule and Expectations

As a one-credit pass/fail course, this class is designed to consist of a minimum of 15 “contact hours” and 30 “non-contact hours” throughout the course of the semester in order to satisfy NAU’s course requirements. Considering the duration of the field trip, this course will be providing approximately 32 contact hours throughout the semester.

Course Schedule

Week	Date	Topics & Content	Materials Due
1	08/28/2024	<i>No Class</i>	
2	09/04/2024	<i>No Class</i>	
3	09/11/2024	Introduction	
4	09/18/2024	<i>Literature Review Prep (no class)</i>	
5	09/25/2024	Site Selection Discussion	
6	10/02/2024	<i>Literature Review Prep (no class)</i>	
7	10/9/2024	<i>Literature Review Prep (no class)</i>	
8	10/16/2024	Literature Review Presentation	
9	10/23/2024	<i>No Class</i>	
10	10/30/2024	~ Field Trip (Fri-Sun)	
11	11/06/2024	<i>Final Discussion Prep (no class)</i>	
12	11/13/2024	<i>Final Discussion Prep (no class)</i>	
13	11/20/2024	<i>Final Discussion Prep (no class)</i>	
14	11/27/2024	<i>Final Discussion Prep (no class)</i>	
15	12/4/2024	Field Trip Debrief	

Bold denotes in-class participation

Department and University Policy Statements

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>.

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>.

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, or veteran status. Due to potentially unethical consequences, 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 is the primary federal law that prohibits discrimination on the basis of sex or gender in educational programs or activities. Sex discrimination for this purpose includes sexual harassment, sexual

assault or relationship violence, and stalking (including cyber-stalking). Title IX requires that universities appoint a “Title IX Coordinator” to monitor the institution’s compliance with this important civil rights law. NAU’s Title IX Coordinator is Elyce C. Morris. The Title IX Coordinator is available to meet with any student to discuss any Title IX issue or concern. You may contact the Title IX Coordinator by phone at 928-523-3515, by fax at 928-523-0640, or by email at elyce.morris@nau.edu. In furtherance of its Title IX obligations, NAU will promptly investigate and equitably resolve all reports of sex or gender-based discrimination, harassment, or sexual misconduct and will eliminate any hostile environment as defined by law. Additional important information about Title IX and related student 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), 928-523-6906 (TTY), 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.