

## Department of Astronomy and Planetary Science AST 201: Introduction to Indigenous Astronomy Fall 2021

### Meeting Times

- **In-person Lecture:** MW 2:20 — 3:10pm, Liberal Arts, Rm 120
- or
- **Asynchronous Learning:** Online Blackboard Learn Course Page

AND

### In-person Lab Sections:

- AST201-9: Mon 6:00 — 6:50pm, Bldg 19, Rm 111 with Cecilia Thieberger
- AST201-10: Mon 7:00 — 7:50pm, Adel, Rm 207 with Cecilia Thieberger
- AST201-11: Tue 6:00 — 6:50pm, Liberal Arts, Rm 341 with Christopher Wolfe
- AST201-12: Tue 7:00 — 7:50pm, Adel, Rm 207 with Catherine Clark
- AST201-13: Wed 6:00 — 6:50pm, Bldg 19, Rm 111 with Catherine Clark
- AST201-14: Wed 7:00 — 7:50pm, Adel, Rm 207 with Catherine Clark
- AST201-15: Thu 6:00 — 6:50pm, Adel, Rm 207 with Cecilia Thieberger
- AST201-16: Thu 7:00 — 7:50pm, Adel, Rm 207 with Cecilia Thieberger

### Credit/ Pre- or co-requisites

3 credit hours, no pre- or co-requisites

### Mode of Instruction

You have the option of choosing to come into class in-person on Monday and Wednesday, or take the lecture course fully remotely through BBLearn. The content materials are identical. You will also have to be in-person for the lab section that you signed up.

**Lecture/Asynchronous Learning** content includes: 1) Online Lectures mixed with Youtube videos, 2) STEP3 Questions and Reading Quiz for each Unit, and 3) Online Midterm and Final Exams.

**Lab Section** content includes: one-hour lab to finish either during the class or at home. The lab instructors have all the rights to decide and change the grading policy and late policy of your lab assignments. Please pay very careful attention to, and work closely with, your lab instructors.

This course is designed to be fully transparent, inclusive, and accessible to all students.

### Instructor Contact & Availability

Dr. Lisa Chien

Email: [Lisa.Chien@nau.edu](mailto:Lisa.Chien@nau.edu)

Office Hours: Please send me questions solely through emails. I will get back to you as soon as I can, definitely within 24 hrs.

Lab instructors:

Cecilia Thieberger ([clt357@nau.edu](mailto:clt357@nau.edu))

Christopher Wolfe ([cw997@nau.edu](mailto:cw997@nau.edu))

Catherine Clark ([catclark@nau.edu](mailto:catclark@nau.edu))

## **Course Purpose & Student Learning Outcome**

When we think of astronomy, we often think of western modern astronomy. However, indigenous peoples have been developing complex systems of understanding the heavens all around the world since before the development of modern astronomical thinking. The course will introduce ancient and living astronomies of native peoples and compare those systems with modern astronomy and planetary science. We will examine how indigenous cultures reference the skies and how they integrate humans into the cosmos. We will examine the importance of worldview and how it affects a person's perception of the universe. The course will focus on observation-based astronomy and the use of technology in the study of indigenous astronomy. It will also examine the use of cultural ethics in the study of space science and traditional native astronomy. The primary cultural focus will be on astronomies of the American Southwest.

Key themes that we will examine throughout the course are— **Valuing the diversity of human experience**, **Environmental consciousness**, and **Technology and its impact**. We will accomplish this by examining the astronomies of different indigenous cultures, their connection to the environment, and the use of technology in the past and present-day study of astronomy. This course satisfies **Cultural Understanding** and **US Ethnic Diversity** Distribution Requirement and is designed to appeal to a broad audience. This requirement will be addressed through the comparisons of (a) ancient and living astronomies of native peoples with western astronomy and modern advances in space science exploration and of (b) the cultural ethics of traditional native astronomy with those of modern space science. This course will address several of the liberal studies essential skills. It will focus on **Critical Thinking**, **Ethical Reasoning**, **Scientific Inquiry**, and the **Use of Technology**.

This course has several objectives and learning outcomes that will be addressed during the lecture and in the assigned reading. By the end of the semester, students will be able to

1. describe the role of diverse cultures in understanding the relationship of man to the universe we live in.
2. use critical reasoning to understand the ways of knowing and resulting narratives associated with indigenous cosmologies, cosmologies widely accepted in the western pre-scientific era, and those of modern science.
3. use knowledge gained from direct observation, critical thinking and technology-based observations and analyses to locate the moon, planets, and stars that are important to indigenous peoples and describe their cycles, phases, physical characteristics, and significance in diverse cultural settings.
4. learn how ancient and modern indigenous cultures often practiced observational astronomy in ways that resemble scientific practice.

## **Required Materials & Technology**

None, however you need to have stable internet connection in order to watch online lecture videos, participate online assignments, and finish online exams.



*We will be using an interactive astronomy software developed by University of Nebraska Lincoln, called **ClassAction**, to enhance online learning. It is essential to your understanding and **required** to answer STEP3 Questions and Reading Quizzes on BBLearn (see below). Please go to **this page** (<https://astro.unl.edu/nativeapps/>) to download and install it on your computer (super easy too!). You can also watch the video on their website to see details of installation (on both Windows and Mac). Please contact Dr. Chien ([lisa.Chien@nau.edu](mailto:lisa.Chien@nau.edu)) ASAP if you cannot install the software for any reasons.*

## Grading System & Late Policy

Assessment	Points
Participation	180
Reading Quiz	100
Final Exam	90
Midterm Exam	70
Lab	60

Grade	Total Points You Earned
A	448 — 500 or more
B	398 — 447
C	348 — 397
D	298 — 347
F	0 — 297

### **Connection Issues and Late Submission Policy for all Assignments:**

If you encounter any difficulties accessing any assignments on BBLearn, first keep trying with different internet connections, browsers, or devices. If problems still exist and it is getting close to 6 hours before the due date, *i.e.*, 6:00pm on Fridays and Mondays, please email me as soon as you can and I can give you an extension for **another 24 hours**. **Please, you have to let me know that you're having difficulties, otherwise late submissions for**

- **STEP3 Questions: 2 points off**
- **Reading Quiz: 2 points off**
- **Exams: count as 0 points**
- **Labs: Ask your lab instructor for late policy**

## Assignments & Assessments

### 1. **STEP 3 Questions**

In each Section of each Unit, there is a small portion of participation questions based on the Mini Lectures. These are called **STEP3: Unit X.X Questions** on BBLearn. These Questions are administered as a “Test/Quiz” format on BBLearn, however you can have unlimited attempts, and only the highest grade is counted BEFORE the due date. **Each Unit has 3 to 4 Sections, and so 16 to 17 Participation Points. No Participation points are dropped, so total Participation points from all Units are 180 points. These Participation Questions are due every Monday.**

### 2. **Reading Quiz**

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 are 10 questions, and thus 10 points, in each quiz. One lowest Reading Quiz score is dropped, so total of Reading Quiz points counted are 100 points. Reading Quizzes are due every Monday.**

### 3. **BBLearn Exams**

**Midterm Exam: due Friday, October 15, 11:59pm | Unit 1 to 5, total 70 points**

**Final Exam: due Tuesday, Dec 7, 11:59pm | Unit 6 to 11, total 90 points**

The exams are all on BBLearn with multiple choice questions, fill-in-the-blanks, matching, and some short-answer questions. **Both exam will be open for five days, and will be closed at the due date/time listed above. Again if you encounter any technical difficulties during your exams, please contact Dr. Chien at [Lisa.Chien@nau.edu](mailto:Lisa.Chien@nau.edu) immediately.**

### 4. **Labs**

The Labs are designed to strengthen your understanding of lecture materials, and will provide the opportunity to investigate or relate to astronomical phenomena as many ancient cultures once did. Some Labs align with specific astronomical events and thus will **require time-sensitive participation or outdoor observations (see schedule below or on BBLearn)**. Submission of Labs are solely through the lab sections to your lab instructor, and they have all the rights to decide or change the grading policy and late policy. **There are 13 labs, and each is 5 points. Week 14 will be for make up labs only, and there will be no labs on Week 15. One lowest Lab score is dropped, so the total of Lab points counted are 60 points.**

Below is a summary of the Assignments and Assessments:

Category	Due (see detail schedule below)	# of Assignments	Points	Includes:
<b>STEP3 Question</b>	Every Monday	11, 16-17 points each	180	ALL STEP3 Questions, NONE Dropped
<b>Reading Quiz</b>	Every Monday	11, 10 points each	100	1 Lowest Dropped
<b>Lab</b>	Every lab	13, 5 points each	60	1 Lowest Dropped
<b>Midterm Exam</b>	Due 10/15, Fri, 11:59pm on LOUIE	1	70	Unit 1 to 5 Materials
<b>Final Exam</b>	Due 12/7, Tue, 11:59pm on LOUIE	1	90	Unit 6 to 11 Materials

## **Supplemental Apps**

To help you get used to sky viewing, here are some free (lite version), helpful and highly recommended apps/software (NOT required for the class). All these apps/software allow you to point your device to the sky, and displays and identifies objects right on your device! You will also learn about this apps in Lab 1.



**SkyView**— I recommend this one among the two below, since it overlays on what you see through your camera, and you can take a quick picture with labels on the sky!



**Night Sky**— This app has incredible visualization, and when you pinch or tap on the constellations or any objects, it takes you to a 3D view of the stars in space and shows you more than enough of information you want to know about the object.



**Star Chart**— It's simple and easy to use (without information overload), and when you tap on objects, it give you nice simple astronomical data about them.



**stellarium.org**— Stellarium is a free open source planetarium for your computer (which also has a web form: [stellarium-web.org/](http://stellarium-web.org/) and a non-free app called Stellarium Mobile PLUS Sky Map). It shows a realistic sky in 3D, just like what you see with the naked eye, binoculars or a telescope.

## **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.

**Class Tentative Schedule (Please see BBLearn page for most updated version)**

Week	Date	Day	Topic		STEP3 Questions DUE	Reading Quiz DUE	AST201 Lab	
			Unit	Section				
1	8/23	Mon	Unit 1: Connecting With the Sky	1.1			#1: Connecting Western and Indigenous Astronomy	
	8/25	Wed		1.2, 1.3				
2	8/30	Mon		1.3			#2: Globe at Night	
	9/1	Wed	Unit 2: Cultural History of Indigenous People in North & Central America	2.1				
3	9/6	Mon	<b>No Class</b>		<b>Unit 1</b>	<b>Unit 1</b>	#3: Origins of the World	
	9/8	Wed		2.1, 2.2				
4	9/13	Mon		2.3	-	-	#4: Equinox And Calendar (Fall Equinox: 9/22)	
	9/15	Wed	Unit 3: Cosmogony and Cosmology in Native & Western Astronomies	3.1				
5	9/20	Mon		3.2	<b>Unit 2</b>	<b>Unit 2</b>	#5: Figures in the Sky	
	9/22	Wed	Unit 4: Celestial Sphere & Sidereal Motion	4.1				
6	9/27	Mon		4.2	<b>Unit 3</b>	<b>Unit 3</b>	#6: The Winter Count	
	9/29	Wed		4.3				
7	10/4	Mon	Unit 5: Sun & the Diurnal Cycle	5.1, 5.2	<b>Unit 4</b>	<b>Unit 4</b>	#7: Stars and Time	
	10/6	Wed		5.3, 5.4				
8	10/11	Mon	Unit 6: Seasons & the Annual Cycle	6.1	<b>Unit 5</b>	<b>Unit 5</b>	#8: Moon in Native & Modern Eyes	
	10/13	Wed		6.2				
	<b>10/15</b>	<b>Fri</b>	<b>Midterm Exam: Unit 1 to Unit 5 (Mon, 10/11, 6am — Fri, 10/15, 11:59pm)</b>					
9	10/18	Mon	Unit 7: Moon & the Lunar Cycle	7.1	-	-	#9: Moon Phases	
	10/20	Wed		7.2, 7.3				
10	10/25	Mon		7.3	<b>Unit 6</b>	<b>Unit 6</b>	#10: Polynesian Wayfinding	
	10/27	Wed		7.3, 7.4				
11	11/1	Mon	Unit 8: Stars	8.1	<b>Unit 7</b>	<b>Unit 7</b>	#11: The Wandering Stars	
	11/3	Wed		8.2				
12	11/8	Mon		8.3	-	-	#12: Meteor Shower (11/17)	
	11/10	Wed	Unit 9: Constellations	9.1, 9.2				
13	11/15	Mon		9.2, 9.3	<b>Unit 8</b>	<b>Unit 8</b>	#13: Beaver Moon (11/18)	
	11/17	Wed		9.4				
14	11/22	Mon	Unit 10: Planets	10.1	<b>Unit 9</b>	<b>Unit 9</b>	MAKE UP LAB	
	11/24	Wed		10.2				
15	11/29	Mon	Unit 11: Comets, Asteroids & Meteors	11.1, 11.2	<b>Unit 10</b>	<b>Unit 10</b>	-	
	12/1	Wed		11.2, 11.3				
16	12/6	Mon			<b>Unit 11</b>	<b>Unit 11</b>	-	
	<b>12/7</b>	<b>Tue</b>	<b>Final Exam: Unit 6 to Unit 11 (Thur, 12/2, 6am — Tue, 12/7, 11:59pm)</b>					

## **Academic Deadlines**

- ADD/DROP deadline (without “W”): 9/1
- Last day to file for A-Pass/Fail: 9/24
- Last day to withdraw: 11/29

## **Academic Integrity Policy**

**Please read this section carefully as each student is required to understand and comply with all Academic Integrity rules and standards. Both NAU and this Department have standards which are written and referenced below.**

- Passing other’s work off as your own (plagiarism) and cheating are not accepted at NAU and are absolutely not tolerated in this class. It is not the professor’s responsibility to attempt to describe and prohibit any and all forms of Academic Dishonesty. **It is your responsibility to uphold the highest ethical standards.** If you have any doubt or question about this policy, it is your responsibility to ask the professor in advance and to be clear about the answers and policies.
- If you are caught cheating or if any of your **assignments/exams are found suspiciously similar** (such as exact same wording on written responses— note, changing a few words or the order of certain words is still plagiarism!), **ALL** students involved will receive zero points on that assignment or exam. The bottom line: ***Do your own work and do not let others copy off of you.***
- Academic Dishonesty information will be given to the Dean of Students and a written copy of any such incident may be attached to your official NAU file. If cheating/plagiarism continue, you will receive F in the class and the Dean’s office will be notified. University Academic Integrity Policy can be found [here](#).

University Policies can be found at [nau.edu/university-policies/](http://nau.edu/university-policies/).

## **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](mailto: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](mailto: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](mailto: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](mailto: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](mailto: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