NAU NORTHERN ARIZONA UNIVERSITY

College of the Environment,
Forestry, and Natural Sciences

Department of Astronomy and Planetary Science
AST 201: Introduction to Indigenous Astronomy
Fall 2022

Meeting Times

Lectures: MW 9:00 — 9:50am, Liberal Arts, Rm 120
Lab Sections:
AST201-09: Mon 6:00 — 6:50 pm, Bldg 19, Rm 111
AST201-10: Mon 7:00 — 7:50 pm, Bldg 19, Rm 111
AST201-11: Tue 6:00 — 6:50 pm, Bldg 19, Rm 111
AST201-12: Tue 7:00 — 7:50 pm, Bldg 19, Rm 111
AST201-13: Wed 6:00 — 6:50 pm, Bldg 19, Rm 111
AST201-14: Wed 7:00 — 7:50 pm, Bldg 19, Rm 111
AST201-15: Thu 6:00 — 6:50 pm, Bldg 19, Rm 111
AST201-16: Thu 7:00 — 7:50 pm, Bldg 19, Rm 111

Credit/ Pre- or co-requisites

3 credit hours, no pre- or co-requisites

Mode of Instruction

NAU is back **in-person** and our lecture classes are on Mondays and Wednesdays. You also have to be in-person for the lab section that you signed up. Attendance is not required in the lecture classes (but highly recommended), however it IS required for the labs. 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.

Lecture content includes: 1) lectures with slides mixed with Youtube videos, 2) TopHat questions, and 3) an astronomy educational software called ClassAction, starting Unit 4.

After Lecture content includes: 1) reading assignments, 2) reading quiz for each Unit on BBLearn, 3) midterm and 4) final exams on BBLearn.

Lab Section content includes: 1) indoor activities, with or without online resources, requiring creative designs, qualitative analysis, and real-life applications, 2) outdoor observations during class, and 3) observations outside of class time such as observing the solar activities or meteor showers.

Instructor Contact & Availability

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

Email communications strongly preferred first, and please give me 24 hours to reply. I will also be in my office on Mon & Wed 11:00 am — 12:00 pm, Bldg 19, Rm 311, but please let me know that you are coming first. We can also schedule to set up a Zoom meeting.

Lab instructors:
Alejandro Higuera (arh452@nau.edu) — Sections 1 to 8
Pedro Camacho (pdc49@nau.edu) — Sections 9 to 16

Office and hours: TBA

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 ***Scientific Literacy— Physical, Life, Earth, and Space Sciences*** Knowledge Area and the ***Indigenous Peoples*** Diversity Perspectives. 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 General Studies skills— *Critical Thinking, Information Literacy,* and the *Essential Skills of Application(s) and Quantitative Reasoning.*

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:

SLO1. Describe the role of diverse cultures in understanding the relationship of man to the universe we live in.

SLO2. 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.

SLO3. 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.

SLO4. Learn how ancient and modern indigenous cultures often practiced observational astronomy in ways that resemble scientific practice.

SLO5. Evaluate how influences of inequality, power, and privilege— including systems of oppression— affect Indigenous and non-Indigenous perspectives and ideologies

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

Required Materials & Technology

All reading materials and assessments are on 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 exams outside of classroom.

*Starting Unit 4, 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 TopHat 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) ASAP if you cannot install the software for any reasons.*

Grading System & Late Policy

Assessment	Points
TopHat Questions	170
BBLearn Reading Quiz	100
Lab	120
Midterm Exam	70
Final Exam	90
Total	**550**

Grade	Total Points You Earned
A	492 — 550 or more
B	437 — 491
C	382 — 436
D	327 — 381
F	0 — 326

Connection Issues and Late Submission Policy for all Assignments:
If you encounter any difficulties accessing any assignments on TopHat or BBLearn, first keep trying with different internet connections, browsers, or devices. If problems still exist and it is getting close to 6 hours, 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**

- **TopHat Questions: 2 points off**
- **BBLearn Reading Quiz: 2 points off**
- **Exams: count as 0 points**
- **Labs: 1 point off every day**

Assignments & Assessments

1. TopHat Questions

In each Section of each Unit in class, there is a small portion of 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. **Each Unit has 2 to 4 Sections, and there are 12 to 19 Points in each Unit**. No TopHat Questions points are dropped, and total points are 170 points. These TopHat Questions are **ideally answered in the class, but they will also be assigned as homework due in one week from the lecture day**.

2. BBLearn 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 points are 100 points. Reading Quizzes are **due every Monday, 11:59pm.**

3. BBLearn Exams

Midterm Exam: due Wed, 10/19, 11:59pm | Unit 1 to 5, 70 points
Final Exam: due Wed, 12/14, 11:59 pm | Unit 6 to 11, 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 three days, and will be closed at the due date/time listed above.** If you encounter any technical difficulties during your exams, please contact Dr. Chien at *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 the Lab syllabus clearly lists the grading policy and late policy. Please pay very careful attention to, and work closely with, your lab instructors.

There are 13 labs, and each is 10 points (with 1 point as attendance). Week 14 will be for a make-up lab only, and there will be no labs on Week 15. One lowest Lab score is dropped, so the total of Lab points counted are 120 points.

Below is a summary of the Assignments and Assessments:

Category	Due (see detail schedule below)	Points Distribution	Points	Includes:
TopHat Question	Every Monday	12-19 points each Unit	170	ALL TopHat Questions, NONE Dropped
Reading Quiz	Every Monday	11, 10 points each	100	1 Lowest Dropped
Lab	Normally in 1 week	13, 5 points each	120	1 Lowest Dropped
Midterm Exam	Due Fri, 3/4 11:59 pm	1	70	Unit 1 to 5 Materials
Final Exam	Due Tue, 5/3, 5:00 pm	1	90	Unit 6 to 11 Materials

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

Week	Date	Day	Topic		TopHat Qs DUE	Reading Quiz DUE	AST201 Lab (* Requires outdoor observing)
			Unit	Section			
1	8/29	Mon					#1: Connecting Western & Indigenous Astronomy*
	8/31	Wed	Unit 1: Connecting With the Sky	1.1, 1.2			
2	9/5	Mon	**No Class**		-	-	#2: Globe at Night*
	9/7	Wed		1.2, 1.3			
3	9/12	Mon	Unit 2: Cultural History of Indigenous People in North & Central America	2.1	Unit 1	Unit 1	#3: Origins of The World
	9/14	Wed		2.1, 2.2			
4	9/19	Mon		2.3	-	-	#4: Equinox & Calendar* (Fall Equinox: Sep 22)
	9/21	Wed	Unit 3: Cosmogony and Cosmology in Native & Western Astronomies	3.1			
5	9/26	Mon		3.2	Unit 2	Unit 2	#5: Moon in Western & Indigenous Eyes
	9/28	Wed	Unit 4: Celestial Sphere & Sidereal Motion	4.1			
6	10/3	Mon		4.2	Unit 3	Unit 3	#7: Full Moon & The Moonrises* (Full Moon: Oct 10)
	10/5	Wed		4.3			
7	10/10	Mon	Unit 5: Sun & the Diurnal Cycle	5.1, 5.2	Unit 4	Unit 4	#6: Moon Phases*
	10/12	Wed		5.3, 5.4			
8	10/17	Mon	Unit 6: Seasons & the Annual Cycle	6.1	Unit 5	Unit 5	#8: Figures in The Sky
	10/19	Wed		6.2			
	Midterm Exam DUE: Wed 10/19, 11:59pm on BBLearn (Unit 1-5)						
9	10/24	Mon	Unit 7: Moon & the Lunar Cycle	7.1	-	-	#9: Stars & Time*
	10/26	Wed		7.2, 7.3			
10	10/31	Mon		7.3	Unit 6	Unit 6	#10: Polynesian Wayfinding*
	11/2	Wed		7.3, 7.4			
11	11/7	Mon	Unit 8: Stars	8.1	Unit 7	Unit 7	#11: Maya & The Wondering Stars
	11/9	Wed		8.2			
12	11/14	Mon		8.3	-	-	#13: Meteor Showers* (Leonids: Nov 17)
	11/6	Wed	Unit 9: Constellations	9.1, 9.2			
13	11/21	Mon		9.2, 9.3	Unit 8	Unit 8	#12: The Winter Count
	11/23	Wed		9.4			
14	11/28	Mon	Unit 10: Planets	10.1	Unit 9	Unit 9	MAKE UP LAB
	11/30	Wed		10.2			
15	12/5	Mon	Unit 11: Comets, Asteroids & Meteors	11.1, 11.2	Unit 10	Unit 10	-
	12/7	Wed		11.2, 11.3			
16	12/12	Mon			Unit	Unit 11	
	Final Exam DUE: Wed 12/14, 11:59pm on BBLearn (Unit 6-11)						

Academic Deadlines

- ADD/DROP deadline (without "W"): 9/8
- 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.

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.

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 conductive 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 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), 928-523-6906 (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.

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