

Department of Astronomy and Planetary Science
AST 180: Introduction to Astronomy
Fall 2021

Class Information

Course Credits: 3

Prerequisites/Corequisites: None

Mode of Instruction: NAUFlex, Remote Synchronous

Meeting Times: Section 1, TuTh 12:45-2:00pm MST

Location: Zoom, <https://nau.zoom.us/j/97720805065>; Meeting ID: 977 2080 5065, Password: 859092

Instructor

Dr. Cristina Thomas

Cristina.Thomas@nau.edu (Please include AST 180 in the subject of all email)

Office Hours: Tuesday & Wednesday 10-11am MST, Thursday 2-3pm MST, or by appointment

Location: Zoom, <https://nau.zoom.us/j/97720805065>; Meeting ID: 977 2080 5065, Password: 859092

Teaching Assistant

Kathryn Turrentine

kgt44@nau.edu

Office Hours: Friday 11am-12pm MST

Aidan Madden-Watson

aom337@nau.edu

Office Hours: Monday 11am-12pm MST

Location: Zoom, <https://nau.zoom.us/j/97720805065>; Meeting ID: 977 2080 5065, Password: 859092

Course Purpose and Student Learning Outcomes

“Introduction to Astronomy” presents the astronomical phenomena of the universe—*i.e.*, the night sky, planets, stars, galaxies, cosmology—in the context of physical science. Core topics include the scale of the universe, technological tools of astronomy, the Copernican revolution, gravity and the motion of the planets, electromagnetic radiation and spectra, contents of the solar system, the life cycle of stars,

origin and structure of galaxies, and big bang cosmology. The instructor as guided by the textbook will choose the order of topics.

This liberal studies course meets a 3-hour Science and Applied Science requirement if taken by itself; and meets the Lab-science requirement if the separate lab, AST 181, is taken as well. This course will address several of the liberal studies essential skills with a focus on the logic of scientific inquiry.

The overarching goals of this course are for you to understand the nature of science through the eyes of astronomy; to understand the big ideas in astronomy; and to develop a lifelong interest in astronomy and current events surrounding astronomy.

REQUIRED CLASS MATERIALS & TECHNOLOGY

OpenStax: Astronomy

The textbook for this class is available for free online at:

<https://openstax.org/details/books/astronomy>



You can read it online or download a pdf. The reading assignments are included on the class schedule. Please read the relevant chapters before the start of lecture.

Lecture-Tutorials for Introductory Astronomy, 3rd edition

This book provides a number of collaborative learning, inquiry-based activities to be used with introductory astronomy courses. Based on education research, these have been proven to lead to a deeper, more complete understanding through a series of structured questions that prompt you, using reasoning, to identify and correct any misconceptions.

You do not need to purchase this book. For each tutorial assignment, I will provide the pdf on bblearn and you will submit the responses through bblearn.

Zoom

We will meet using Zoom. Attendance will be taken by Zoom, but it is not connected directly to Blackboard. Attendance grades will be imported into Blackboard from Zoom periodically.

Professor and FYLI TA office hours will be in the same Zoom room as the class.

Each lecture will be recorded to enable flexibility for those with difficulty attending the class at the nominal time. You are all encouraged to attend lectures as they happen since the lectures will provide opportunities to collaborate with others and ask the instructor questions.

ASSESSMENT

Review Quizzes (150 points)

There will be 5 review quizzes (30 points each) throughout the semester.

They will be on blackboard for approximately a week before they are due. Each quiz is due by 11:59pm on

the due date listed on the schedule. The correct responses will be posted after the due date for the students to use the quiz questions to study. Some questions from the quizzes will appear in the midterms and final.

Assessment	Points
Review Quizzes	150
Attendance	10
Tutorial Worksheets	240
Projects	250
Midterms (2)	200
Final	150
Total	1000

Grade	Total Score
A	900-1000
B	800-900
C	700-800
D	600-700
F	0-600

Attendance (10 points)

Zoom will take attendance for each class. Each student that attends over 85% of the classes (minimum 22 out of 26 classes) will receive 10 points. Those students below 85% attendance will get points depending on the fraction of classes attended (relative to 22). **Please log in to zoom using your name.**

Tutorial Worksheets (240 points)

Each tutorial worksheet will be worth 20 points. There will be a total of 12 worksheets over the course of the semester and they will be completed in class as noted on the schedule. Each worksheet will be provided as a pdf prior to class and your responses will be submitted via Blackboard. Each tutorial sheet will be due at 11:59pm the day *after* it is discussed in class.

Projects (250 points)

Each student will complete 5 projects. Each project is worth 50 points. The projects have due dates throughout the semester (see schedule). The project descriptions and rubrics will be posted on Blackboard early in the semester. All projects are due at 11:59pm on the listed due date.

Midterms (200 points)

There are 2 midterm exams worth 100 points each. We will use the assigned class time to complete the exams. Both exams will be open book. Please make arrangements in advance if you cannot attend and alternate arrangements will be made.

Final (150 points)

The final will be cumulative and will be open book. Our designated time is Tuesday December 7th 12:30-2:30pm. The final will be posted to Blackboard during that time period. Please make arrangements in advance if you cannot attend and alternate arrangements will be made.

EXTRA CREDIT (Due November 23, 2021 11:59pm)

Extra Credit assignments will be available throughout the semester. Most of these assignments will focus on current astronomy events such as the upcoming launches of NASA's [Lucy mission](#), [James Webb Space Telescope](#), and [DART mission](#). You may complete up to 2 of the current event assignments (15 points each) prior to November 23, 2021 11:59pm. Details for each will be given when assigned.

Additional Extra Credit will be given periodically.

CLASS POLICIES

Any violation of any of the NAU academic integrity policies (including, but not limited to cheating, plagiarism, and fraud) will result in a zero grade for that assignment or examination and may result in failing the course. Additionally, if a student is found to be in violation of the NAU academic integrity policies, the student will be reported to the Department Chair.

Please disclose any disabilities or special requirements to the NAU Disability Resources Office (DR.Registration@nau.edu, (928) 523-8773).

Please come to class on time. Students who arrive late for exams will not be given extra time.

Late assignments will only be accepted if the student has discussed an accommodation with the professor at least 24 hours before the deadline.

Inform the professor immediately if there is a technical difficulty preventing you from turning in an assignment or completing an exam.

Please keep your microphone on mute during lecture. When it is time for a full class discussion or questions, please use 'raise hand' and wait to be called on by the professor or TA.

Please use your video when we are in small group discussions to work on the lecture tutorials. Otherwise, the use of video is left to your discretion.

All lectures will be recorded within zoom. These recordings are only for use by students for this class.

COURSE SCHEDULE

The following schedule includes the lecture topics, exam dates, the assigned text from the openstax astronomy book, the days when the lecture tutorials (LT) will be included in class, and the due dates for the projects and review quizzes.

	Week	T	Th	Text	Topics	Projects	Tutorials	Review
August	1	24			Class Introduction/ A Brief Tour			
			26	Ch 1 & 2	Observing the Sky: The Birth of Astronomy			
September	2	31			Observing the Sky: The Birth of Astronomy		LT	
			2	Ch 4	Earth, Moon, and Sky		LT	
	3	7			Earth, Moon, and Sky		LT	
			9	Ch 3	Orbits and Gravity			R1
	4	14			Orbits and Gravity	P1	LT	
			16	Ch 5	Radiation and Spectra			
	5	21			Radiation and Spectra & Midterm 1 Review		LT	
			23		MIDTERM 1			
	6	28		Ch 6	Astronomical Instruments		LT	
		30		Astronomical Instruments		LT		
October	7	5		Ch 7-10	Earth, Moon, and the Terrestrial Planets	P2		R2
			7	Ch 11	Terrestrial Planets & The Giant Planets			
	8	12			The Giant Planets			
			14	Ch 12	Rings, Moons, and Pluto & Comets			
	9	19		Ch 13	Comets, Asteroids, Meteors	P3		
			21	Ch 14	Meteorites, Planet Formation & Evolution		LT	R3
November	10	26		Ch 15-17	The Sun & Analyzing Starlight & Midterm 2 Review		LT	
			28		MIDTERM 2			
	11	2		Ch 18 & 19	The Stars: A Celestial Census & Celestial Distances		LT	
			4	Ch 20 & 21	The Birth of Stars and Exoplanets	P4	LT	
	12	9		Ch 22-24	Stellar Evolution and The Death of Stars			R4
			11		- NO CLASS - VETERANS DAY			
	13	16		Ch 25	Milky Way Galaxy		LT	
		18	Ch 26 & 27	Galaxies, Active Galaxies, and Quasars				
December	14	23		Ch 29	The Big Bang	P5		
			25		- NO CLASS - THANKSGIVING DAY			
	15	30			Astronomy in the News			R5
December			2		Final Exam Review			
					FINAL EXAM: TUESDAY DECEMBER 7 12:30-2:30pm			

NAU 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>.

Syllabus Policy Statements

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.