

**Course:** AST181: Introduction to Observational Astronomy (Laboratory)  
**Department:** Astronomy and Planetary Science  
**Pre/Co-requisite:** AST180 or AST 180H  
**Term:** Spring 2024  
**Section:** **ALL SECTIONS**  
**Meeting time:** 7:30 – 10:00 PM  
**Mode of Instruction:** Face-to-Face  
**Meeting Locations:** (1) Physical Sciences, Bldg. 19, Rm. 218, (2) BLT telescope, located on campus next to observatory field, (3) Physical Sciences, Bldg. 19, Rm. 321  
**No. Course Credits:** 1

**Lab Instructor:** All sections have the same syllabus although they may have different  
**Pronouns:** instructors. Specific instructor info has been left out of this web-based  
**e-mail:** syllabus.  
subject line)  
**Availability:**  
**Urgent matters:**  
**Office Location:**  
**Office Hours:**

### Suggested Materials

- Calculator
- Something to write with (A pen/pencil, tablet, or other device suitable for sketching things like the phase of the moon or constellations in the sky)
- Red light flashlight (when outside)
- Warm clothes when we are outside
- A can do attitude!!
  - Science is awesome, enjoy it!!

### Course Description

This course serves as an introduction to observational astronomy. We will be concentrating on the night sky and will use 10in Celestron telescopes located next to the Barry Lutz Telescope (BLT) telescope when conditions permit (as in, the sky is clear); otherwise, we will focus on exploring the motions of astronomical objects and other key concepts. When paired with the three-hour lecture course, Astronomy 180, the pair of courses meets the four-hour laboratory science component for liberal studies. The thematic focus of this course is Technology and its Impact, since we will examine how the use of telescopes changes the way we see the sky. The skills we will be concentrating on are the use of technology, specifically telescopes and/or computers; the logic of scientific inquiry, which is

at the heart of each laboratory exercise; quantitative reasoning developed during your analysis of your observations; and spatial reasoning developed during studies of the celestial sphere and the motions of the sun and planets.

### **Course Objectives**

After successful completion of this course, you will be able to:

- (a) Point out the basic stars and constellations in the night sky.
- (b) Use a telescope to examine planets and other bright objects.
- (c) Sketch the daily and annual motions of the sun and other astronomical objects.
- (d) Use a variety of computer programs to illustrate basic astronomical concepts.
- (e) Use the method of scientific inquiry to explain observational phenomena.
- (f) Have fun :)

### **Course Structure**

Instruction for this course is scheduled to be carried out entirely in-person. This course provides the special opportunity to make use of a suite of 10in Celestron telescopes. This course is outside, **DRESS WARM!!** This will enable you to get a better feel for modern observational astronomy. Some labs will ask you to go outside and interact with the night sky, such as for sketching the moon or constellations. Most labs are due the week they are assigned, while other labs may require more time to complete (such as to see all phases of the moon); your lab instructor will make these expectations clear for each lab. Your lab instructor will set up a way to inform you of the night's scheduled lab, whether indoors or outdoors, based on sky conditions.

### **Lab Ordering/Weather**

The nature of astronomy means that we are at the mercy of the weather, so the labs may appear out of order from what your friends in other lab sections are doing. This also means that our lab may change with little notice before class including where we will be meeting. **This means that you will need to be looking for a confirmation from your instructor before class about the plans for the day. It is the instructor's responsibility to communicate effectively.**

### **Face-to-Face**

Class is offered via face-to-face instruction. This underscores the importance of **open and early communication** between the instructor and the class, consisting of 1) Checking e-mail and Canvas before coming to lab in the event of last-minute announcements, and 2) Notifying your instructor as soon as possible if you may have been exposed to COVID-19 or if there are any other reasons you will not be able to attend class.

### **Lab Assignments**

Each lab is different in how the work will be conducted. To maintain as much consistency for you, each assignment will have a Canvas turn in. Each week, the lab will be presented by the instructor in the manner most fitting that lab. Ideally, the lab reports should be turned in at the end of the lab period; however, they will not be considered late until the start of the next lab meeting (the Monday following) that lab project. There may be some lab assignments given as take-home projects; these are to be completed outside of class and turned in by the date directed. All labs must be turned into

Canvas, so if you are working by hand, please plan to digitize your work accordingly (e.g., by taking pictures or filling in the pdf later).

### **Final Project**

Besides weekly labs your only other assignment is a term project. The final project will allow you to complete an astronomy based project personal to you.

### **Grading System**

Your total grade is weighted as follows:

|                      |             |
|----------------------|-------------|
| Lab Assignments      | 85%         |
| <u>Final Project</u> | <u>15%</u>  |
| <b>Total</b>         | <b>100%</b> |

There will be a total of 11 labs. The lowest grade will be dropped.

### **Missed Labs and Make-ups**

You are allowed 2 excused absences that will not require a make up. If, and only if, you notify your instructor about your absence no later than 48 hours after the class time, will your absence be excused. All we ask is that you communicate your absence with us, **we will not ask for details**. If you have more than 2 excused absences the instructor will work with you to figure out a way to make up the work. Because telescope labs are completed in real time, there is no guarantee that you will be able to make up the exact lab. It may be possible to make it up during another section. **If you do not communicate your absence to your instructor within 48 hours after your class period you will be considered absent without reason and will not be allowed to make up a lab. This will result in a lab grade of zero.**

### **Late Policy**

Most labs in this course can be completed during class time and would be due at the end of the lab under ordinary circumstances. If the lab is not turned by the start of the next class period, labs are considered late and accrue a 10% penalty each day at 5 PM until the following class periods. Thus, labs not completed within 2 weeks of the assignment being handed out are considered missed and will record a grade of 0. Take-home projects (e.g. Moon phases lab) have firm deadlines and will similarly accrue daily late penalties after the stated deadline at 10% per day until the 5<sup>th</sup> day when the grade will be set to 0.

### **Night Time Logistics, Parking, Directions**

The nature of this class is that it will be held at night. Please be safe. You can use the following resources and suggestions to ensure you get home safely.

- Non Emergency NAU #: (928) 523-3611
- NAU Safe App
- Request a safety escort (use either the app or number above)
- Walking with a buddy or group is a great idea

## Tentative Schedule

Below is a tentative schedule for the class. Remember that labs may be delayed due to weather so the actual lab order may differ from this list and from your peers in other sections. Be sure to check your email and Canvas before coming to lab because weather conditions can change quickly.

| Week | Dates     | Lab  |
|------|-----------|--|
| 1    | 1/15-1/21 | NO LAB   |
| 2    | 1/22-1/28 | Lab 1: The Size of Astronomy                         |
| 3    | 1/29-2/4  | Lab 2: The Celestial Sphere                          |
| 4    | 2/5-2/11  | Lab 3: Finding Things in The Sky                     |
| 5    | 2/12-2/18 | Lab 4: Constellations                                |
| 6    | 2/19-2/25 | Lab 5: The Motion of the Moon Through Constellations |
| 7    | 2/26-3/3  | Lab 6: Intro to the Barry Lutz Telescope             |
| 8    | 3/4-3/10  | Lab 7: Deep Sky Objects                              |
| 9    | 3/11-3/17 | NO LAB (Spring Break)                                |
| 10   | 3/18-3/24 | Lab 8: Angular Measurement                           |
| 11   | 3/25-3/31 | Lab 9: Telescopic Observations of Lunar Surface      |
| 12   | 4/1-4/7   | Lab 10: Galactic Structure                           |
| 13   | 4/8-4/14  | Lab 11: Reasons for Seasons                          |
| 14   | 4/15-4/21 | Final Project  |
| 15   | 4/28-5/3  | Final Project  |
| 16   | 5/4-5/9   | Finals Week (No Class)                               |

## COVID-19 REQUIREMENTS AND INFORMATION

The following statements in red set forth in this document's first section are specific to NAU's response to the COVID-19 situation. The requirements outlined below are mandatory until further notice. They are based upon current public health conditions and guidance and may change as circumstances warrant or new information becomes available. 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/lumberjack-responsibilities>.

## **FACE COVERING AND PHYSICAL DISTANCING REQUIREMENTS**

Appropriate face masks or other suitable face coverings must be worn by all individuals when present in classrooms, laboratories, studios, and other dedicated educational spaces. To maximize the benefits of physical distancing as an important strategy to help reduce community transmission of the SARS-CoV-2 virus, instructors may implement mandatory student seating arrangements or specific seat assignments. Instructors may remove students who do not cooperate with these requirements from the instructional space in the absence of an approved accommodation arranged through Disability Resources. Failing to comply with these requirements may constitute a violation of the university's *Disruptive Behavior in an Instructional Setting* policy available at <https://nau.edu/university-policy-library/disruptive-behavior>.

## **USE NAUFLEX TO HELP MAINTAIN PHYSICAL DISTANCING**

NAUFlex (available at <https://nau.edu/nauflex/student>) is designed to help all students actively participate in their coursework during the required day and time of a course when they are not physically present in the classroom. This course design model allows students to be fully engaged with faculty and peers and receive the high-quality educational experience for which NAU is known.

## **CLASS SESSION RECORDINGS FOR STUDENTS AND FACULTY USE ONLY**

Certain class sessions may be audio or video recorded to help reinforce live instruction during the COVID-19 pandemic. These recordings are for the sole use of the instructor and students enrolled in the course. Recordings will be stored in approved, accessible repositories. By enrolling, students agree to have their image and classroom statements recorded for this purpose, to respect the privacy of their fellow students, and university-owned intellectual property (including, but not limited to, all course materials) by not sharing recordings from their courses. Questions regarding restrictions on the use of classroom audio or video recordings may be addressed to the appropriate academic unit administrator.

# **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](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.

*Last revised January 6, 2021*