

# AST 184L: Life in the Universe Lab

## Fall 2023 Syllabus

College of the Environment, Forestry, & Natural Sciences

Department of Astronomy and Planetary Science

Semester: Fall 2023

Prerequisites: None

Corequisites: AST 183

Location: Physical Sciences (Bldg. 19), Rm. 111

Meeting Times:

- M/Tu/W: 6:30-9:00 pm

Mode of Instruction: In Person

Instructor: Helen Eifert, he248@nau.edu, (914) 420-0686

Office Location: Peterson (Bldg. 22), Rm. 207

Office Hours: Monday - Wednesday, 14:00-16:00, or by appointment

---

Note: the information in this document is subject to change *without notice* and any information provided verbally by your instructor supersedes that in this document (with the exception of official NAU policy)

---

### **Course Purpose:**

This one-credit laboratory complements the lecture course AST 183: Life in the Universe, a multidisciplinary exploration of modern scientific inquiry into the question of life's origin, evolution, and future place in the Universe. This course uses the exceptional environment of Northern Arizona – its dark skies, deep sedimentary rock exposures, meteor impact record, volcanic terrain, and nearby halophilic organisms – as a unique laboratory wherein students will have direct contact with the kinds of data used to draw diverse astrobiological conclusions. This lab course will also include two *mandatory*, all-day field trips to occur on two weekends, one to Meteor Crater and one to the Grand Canyon.

### **Course Learning Outcomes:**

This lab will ideally serve to supplement the information learned in the Life in the Universe lecture course. Broadly, we will discuss topics related to both the concept and actual practice of searching for life in the universe, such as:

1. The astronomical setting for life as we know it
2. Nearby stars/planets and the prospects for life
3. The evidence used to construct our picture of the history of complex life on Earth

### **Assessments (grading weights):**

Assessments will be in the form of i) lab reports, ii) lab follow ups, and iii) end of the semester project.

*i) Lab Reports:* Virtually all lab projects will involve lab reports. The lab reports should be turned in at the end of the lab period or at the start of the class session the following week. Field lab assignments may be given as take-home projects; these are to be completed outside of class and turned in as directed.

- Any labs turned in after the due date will have 10% of the points deducted immediately and 10% for *each additional day* the assignment is late

# AST 184L: Life in the Universe Lab

## Fall 2023 Syllabus

ii) Lab Follow-Up and Surveys: Most labs, including field trips, will be followed by an online survey, quiz, or assignment. These assignments are mandatory and may account for up to 25% of the value of the corresponding lab.

iii) End of Semester Project: You will spend the last several class sessions working on a project that should synthesize your knowledge gained throughout the semester. More information will be provided during the class.

### Grading system:

The breakdown of percentage points is as follows:

|   |             |
|---|-------------|
| <i>Classroom Lab Reports &amp; Assignments</i>  | 65%         |
| <i>Field Trip Lab Reports &amp; Assignments</i> | 25%         |
| <i>Final Project</i>                            | 10%         |
| <b>Total</b>                                    | <b>100%</b> |

|                              |             |   |   |
|------------------------------|-------------|---|---|
| <b><u>Grading Scale:</u></b> | 89.5-100%   | → | A |
|                              | 79.5-89.49% | → | B |
|                              | 69.5-79.49% | → | C |
|                              | 59.5-69.49% | → | D |
|                              | ≤ 59.49%    | → | F |

**Attendance:** Attendance of the lab is mandatory. Please be ready to learn by the start of the lab each week. Students must attend the section they are registered for. Except in cases of an excused absence, documented through the dean of students, or proper university channels, missed labs cannot be made up and will be given a grade of zero.

### **Readings and Materials:**

**Readings:** There are no assigned readings, unless you are making up an assignment.

**Materials:** To each class you should bring notebook paper and pencils/pens. Scientific calculators are recommended. Laptops may be required for some assignments - if needed, a laptop can be lent to you by the campus library via the following link:

<https://nau.edu/library/laptops-equipment/>

**Field trip materials:** You will also be required to complete an assignment while on the field trip, so you should bring a clipboard and writing utensils. The field trips will involve extensive (but not strenuous) walking on uneven terrain and may be carried out during inclement weather (e.g., rain/snow). As such, you should plan to wear sturdy shoes (e.g., hiking boots) and bring appropriate clothing (e.g., light/heavy jackets, hats, sunscreen) and supplies (e.g., water, food). **If you do not have access to appropriate clothing or supplies, speak with your instructor to determine the best course of action.**

### **Class Policies:**

**Behavioral Standards of Conduct:** Please silence cell phones before class. Laptops, tablets, and/or phones may be used for class purposes (e.g., taking notes) *only*. Using devices for non-class purposes is distracting to students around you, and creating such disruption to the class learning environment is selfish and unacceptable. If devices are used in ways that are disruptive, the privilege of using them will be revoked (i.e., they will no longer be allowed) for those abusing the privilege.

Extensive research demonstrates that *the human brain cannot multitask*. Our focus simply shifts back and forth from one task to the other, a switching process that takes time, and

## AST 184L: Life in the Universe Lab

### Fall 2023 Syllabus

so we are less efficient at both tasks, and our brains get worse at switching the more we try to do it. In other words, it is not physically possible to both pay attention to lecture and do something else on your device. Your learning and understanding will be diminished.

In the case of unsafe, inappropriate, disrespectful, or disruptive behavior, the instructor will dismiss you from the classroom after a verbal warning is given. If a student is asked to leave they will be given a zero for that assignment and the lecture course instructor will be notified.

**Academic Standards of Conduct:** Although the lab environment encourages group discussion, students must complete, and turn in, their own work. Cheating of any kind is not allowed and includes: exchanging answers with other students (in and out of lab), showing up to lab with work already completed, using unapproved resources during lab, plagiarizing, or other activities listed in the Academic Integrity policy (<https://policy.nau.edu/policy/policy.aspx?num=100601/>). Failure to comply with the code of conduct will result in immediate disciplinary action, which can include: being given a zero on an assignment, suspension, or an "F" in the course.

### TENTATIVE COURSE SCHEDULE

| Week | Week of     | Laboratory Exercise   |
|------|-------------|---|
| 1    | Aug. 28     | Course Introduction   |
| 2    | Sep. 4      | LABOR DAY (NO LAB)  |
| 3    | Sep. 11     | Lab 1: The Size of Astronomy                                      |
| 4    | Sep. 18     | Lab 2: Rock Identification  |
| 5    | Sep. 25     | Lab 3: Evolution  |
|      | Sa, Sep. 30 | <b>Tentative Date - Field Trip to Meteor &amp; Sunset Craters</b> |
| 6    | Oct. 2      | Lab 4: Mass Extinctions   |
| 7    | Oct. 9      | Lab 5: Fossils  |
| 8    | Oct. 16     | Lab 6: Microbiology   |
| 9    | Oct. 23     | Lab 7: Exploring Mars   |
|      | Sa, Oct. 28 | <b>Tentative Date - Field Trip to Grand Canyon</b>                |
| 10   | Oct. 30     | Lab 8: Outer planets and moons                                    |
| 11   | Nov. 6      | Final project day 1   |
| 12   | Nov. 13     | Final project day 2   |
| 13   | Nov. 20     | THANKSGIVING (NO LAB)   |
| 14   | Nov. 27     | Final project day 3   |

# AST 184L: Life in the Universe Lab

## Fall 2023 Syllabus

### 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>.

#### 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 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, 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)

# AST 184L: Life in the Universe Lab

## Fall 2023 Syllabus

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 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](mailto: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), 928-523-8747 (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>.

# **AST 184L: Life in the Universe Lab**

## **Fall 2023 Syllabus**

### **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.