



Alien Earths (a.k.a. Evolution of Habitable Worlds)
PTY5/ASTR 170A1
Spring Semester 2023

Instructor:

Dr. Steve Kortenkamp (kortenka@arizona.edu)
Lunar and Planetary Laboratory, Kuiper Space Sciences building, Room 353
See class D2L page for other members of our teaching team and our office hours

Class Meeting Logistics:

This is an in-person class
Mondays and Wednesdays 12:30-1:45pm
Flandrau Science Center Planetarium

Course Description:

Thousands of planets have been discovered orbiting nearby stars. How many of these worlds can we expect to be Earth-like? We explore this question from the multiple perspectives – including those of astronomers, geologists, climate scientists, and historians. We look far back at Earth's history to periods when our planet itself would appear very alien to us today. We study the nearby planets Venus and Mars, which were once more Earth-like than today. We discuss not only the evolution of Earth, Venus, and Mars as habitable worlds but also how human understanding of these planets has evolved. Finally, we apply these perspectives to the search for alien Earths in our galaxy. This interdisciplinary treatment of Earth, its neighboring planets, and planets being discovered around nearby stars allows us to consider the potentially unique position of Earth as a habitable world not only in space but in time.

Course Components:

This course will involve several components; 1) in-class activities, writings, and review questions based on the content, 2) a collection of 1-page written essays (6-8 of these), 3) an 8-week Sun Observing project that is one of our Signature Assignment options, 4) a Cosmic Calendar video documentary project that is another of our Signature Assignment options. The schedule of written essay due dates and required Signature Assignment milestones will be announced in class and posted on the class D2L page. The portfolio of written essays and the Signature Assignment(s) will fulfill the requirement of a summative assessment in this course. There will be no exams in this course.

Division of Grade:

Each student designs their own customized weighting for the different components of the course from the allowed ranges listed at right. Total weighting

Course Component

Allowed Range

Mandatory Reflection	5%
In-Class Activities	0-25%
Collection of 1-Page Written Essays	35-50%
8-Week Sun Observing Project	0-50%
Cosmic Calendar Video Documentary Project	0-50%

must add up to 100%. Each component is described in detail during class and feedback is provided on early work for each component prior to the selection deadline, which is at the end of the first 4 weeks of class. After the selection deadline passes all grading choices are final and cannot be changed. Three examples of the many possible combinations are shown below. Please use 5% increments.

Example 1		Example 2		Example 3	
Reflection	5%	Reflection	5%	Reflection	5%
In-Class	15%	In-Class	0%	In-Class	20%
1-Page Essays	35%	1-Page Essays	50%	1-Page Essays	50%
Sun Project	0%	Sun Project	25%	Sun Project	25%
Cosmic Calendar	45%	Cosmic Calendar	20%	Cosmic Calendar	0%
Total	100%	Total	100%	Total	100%

Final Letter Grade:

The nominal scale shown here will be used to determine the final letter grades in the course from the overall cumulative percentage. A lower “curve” may be used.

A: 90% and higher
B: 80-89%
C: 70-79%
D: 55-69%
E: below 55%

Course Objectives:

This course builds connections between the perspectives of astronomers, geologists, and climate scientists – that is, their ways of thinking, knowing, and doing. Specifically, students will (1) use writing to demonstrate the methodologies and knowledge that characterize these perspectives in the context of searching for Earth-like planets in space and in time, (2) obtain their own data – such as images, measurements from scale models, and observations of local natural phenomena, (3) use writing to apply these perspectives to critically analyze and interpret their images and quantitative data, (4) communicate their work – through written essays and recorded video presentations – with an audience of educated non-expert peers, and (5) discuss the past and current contributions of scientists with diverse backgrounds and the complexities faced by students and scientists with disabilities – particularly those who are blind or visually impaired.

Student Learning Outcomes:

Upon successful completion of this course students will be able to (1) communicate through writing a broad understanding of the concepts involved with the evolution of Earth-like planets in our solar system and around other stars, (2) write about the

approaches and methodologies of astronomers, geologists, and climate scientists and consider benefits of these perspectives for larger society, (3) demonstrate competency in working with numerical information by critically analyzing quantitative information, generating ideas that are supported by quantitative evidence, assessing the relevance of data and its associated implications in a variety of contexts, and communicating those ideas and/or associated interpretations using various formats (e.g., written essays, recorded video presentations, use of graphs and/or tables), (4) effectively communicate an understanding of these concepts to their SOS peers by writing in a variety of contexts and through consistent use of specific conventions of organization, design, style, mechanics and citation format while reflecting on their writing development and, (5) demonstrate practical skills with a variety of software, including Word, Excel, Keynote, PowerPoint, and image/video editing apps.

Course Administration:

The course web page is maintained through D2L. All work for this class **MUST** be submitted electronically to designated D2L assignment folders. The D2L tool will automatically check your writing against on-line sources. Because of this check, the vast majority of you who do your own work and cite your sources of information properly will not have to compete with students who commit plagiarism. To ensure fairness to all students, late work will generally not be accepted after the due date/time except under extraordinary circumstances or with prior approval. If you miss a deadline by just a few minutes, email the work to the instructor immediately and explain the situation. If you anticipate a problem meeting a deadline (job interview, travel for athletics, sick with Covid, etc) email the instructor to work out a solution prior to the deadline.

In the Classroom:

No food or drink (except for bottled water) is permitted in the planetarium. Please arrive on time so that you won't be locked out when the doors are closed and the lights are turned off. Showing up late (and leaving early) leads to a disruption and is not fair to those students who wish to participate in the class. Of course, there are occasional unavoidable reasons for arriving late. If you arrive late, or must leave early, please do so as quietly as possible. Other forms of class disruption are not acceptable. The instructor may choose to drop a student for persisting in disrupting the class using the Administrative Drop procedure.

Regular attendance and effective participation is essential to do well in this course. Whether present in class or not, however, you are responsible for remaining aware of class activities and submitting assigned work by the due date.

If you must miss more than one week of class, you should contact the Dean of Students Office DOS-deanofstudents@email.arizona.edu to share documentation about the challenges you are facing.

Errors in Grading:

An effort will be made to return graded material in a timely manner. Make sure to review all of your graded material as soon as possible. Occasionally errors in grading may occur. If you spot such an error, you must call it to the attention of the instructor **within one week**.

Extra Credit:

There will be opportunities for extra credit during the semester but these opportunities tend to diminish toward the end of the term. Take advantage of these opportunities while they exist. In addition, Dr K often issues significant bonus points on Signature Assignments for exceptional work that goes beyond the nominal requirements of the project. The total amount of extra credit that can count towards the final overall letter grade is capped at 5% (essentially half of a letter grade). If you have interesting ideas for extra credit work please tell Dr. K as early in the semester as possible.

Absence and Class Participation Policy:

The UA policy concerning Class Attendance, Participation, and Administrative Drops is available at:

catalog.arizona.edu/policy/class-attendance-participation-and-administrative-drop

The UA policy regarding absences for any sincerely held religious customs will be accommodated where reasonable:

policy.arizona.edu/human-resources/religious-accommodation-policy

Absences preapproved by the UA Dean of Students (or dean's designee) will be honored. See policy.arizona.edu/employmenthuman-resources/attendance

Accessibility and Accommodations:

It is the University's goal that learning experiences be as accessible as possible. If you anticipate or experience physical or academic barriers based on disability or pregnancy, please let the instructor know immediately so that options can be discussed. You are also welcome to contact Disability Resources (520-621-3268) to establish reasonable accommodations. Please be aware that the accessible positions in this room should remain available for students who find that standard classroom seating is not usable.

Honors Credit:

As this is a GenEd course it is available for Honors credit. Honors contract information is available at www.honors.arizona.edu/future-students/honors-credit-across-campus. See the instructor to discuss your ideas for an honors contract.

Makeup Policy for Students Who Register Late:

Students who register by the end of the first week of classes will be given an opportunity to make up missed work within a reasonable time to be mutually agreed upon by the instructor and student.

Course Communications:

Communication will primarily be done with in-class announcements and through the course D2L page. If email communication with the instructor or TAs is needed please use only your official UA email address to avoid the chance of your message being rejected as junk mail.

Required Out-Of-Class Activities:

In addition to the written essay assignments significant out-of-class effort will be needed for this course. The Signature Assignment projects will require many hours of work outside of class over the course of the semester.

Academic Integrity:

Both students and faculty are bound by the University's Code of Academic Integrity, which covers many forms of academic dishonesty. Students are encouraged to share intellectual views and discuss freely the principles and applications of course materials. However, graded work/exercises must be the product of independent effort unless otherwise instructed. This means that work submitted in your name must be the result of your own scholarly efforts. In this course it is typical each semester for 5-7 students to be caught plagiarizing on homework or attempting to cheat on the term project. Every such incident is reported to the Dean of Students. Don't be one of these students! Details on the code of academic integrity are available at:

deanofstudents.arizona.edu/policies/code-academic-integrity

The University Libraries have some excellent tips for avoiding plagiarism, see:

new.library.arizona.edu/research/citing/plagiarism

Classroom Behavior Policy:

To foster a positive learning environment, students and instructors have a shared responsibility. We want a safe, welcoming, and inclusive environment where all of us feel comfortable with each other and where we can challenge ourselves to succeed. To that end, our focus is on the tasks at hand and not on extraneous activities (e.g., texting, chatting, online shopping, etc.).

This course also supports elective gender pronoun use and self-identification; rosters indicating such choices will be updated throughout the semester, upon student request. As the course includes some group work and discussion, it is vitally important for us to create an educational environment of inclusion and mutual respect.

Threatening Behavior:

UA policy prohibits threats of physical harm to any member of the University community. Details on the policy are available at:

policy.arizona.edu/education-and-student-affairs/threatening-behavior-students.

Nondiscrimination and Anti-harassment:

The University is committed to creating and maintaining an environment free of discrimination. Our classroom is a place where everyone is encouraged to express

well-formed opinions and their reasons for those opinions. We also want to create a tolerant and open environment where such opinions can be expressed without resorting to bullying or discrimination of others. Details on the official UA policy are available at:

policy.arizona.edu/human-resources/nondiscrimination-and-anti-harassment-policy

Additional Resources for Students:

UA Academic policies and procedures are available at catalog.arizona.edu/policies.

Student Assistance and Advocacy information is available at:

deanofstudents.arizona.edu/student-assistance/students/student-assistance

Confidentiality of Student Records:

All student records, not just grades but also any identifiable material submitted for credit are handled according to FERPA guidelines, see

www.registrar.arizona.edu/ferpa/default.htm

Subject to Change Statement:

Information contained in this course syllabus, other than the grade and absence policy, may be subject to change with advance notice, as deemed appropriate by the instructor.