



Alien Earths
PTYS/ASTR 170A1
Spring 2024

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.

Instructor:

Dr. Steve Kortenkamp
Lunar and Planetary Laboratory, Kuiper Space Sciences Building
See class D2L page for our teaching team contact information and office hours

Class Logistics:

This is 7.5-Week asynchronous on-line class organized by the Topics below
On-line materials (recordings and assignments) will be released on a weekly basis
Due dates for class work and assignments will occur weekly
No work will be accepted after each weekly deadline has passed

Tentative Schedule of Topics:

Topic 1: Course Introduction and Our Early Understanding of Earth
Topic 2: Beginner’s Guide to Earth-Like Planets
Topic 3: Making Earth-Like Planets
Topic 4: Oceans, Atmospheres, and Gravity
Topic 5: Tides, Time, and the Age of Earth
Topic 6: Mars as an Alien Earth
Topic 7: Venus as an Alien Earth
Topic 8: Finding Planets around Nearby Stars
Topic 9: Fingerprints in Light
Topic 10: Asteroids, Impacts, and Earth’s Recent History

Course Communication:

If email communication with the instructor or TAs is needed, please use only your official UA email address (e.g., kortenka@arizona.edu) and put “Alien Earths” in the subject line. This helps us sort important messages and distinguishes which class you are in (most of us are involved at teachers and students in several different classes). Always start your email with an appropriate salutation, such as *Hi Dr K* or *Hello Jillian*. It is professional and helps us, help you. I’m sure we all try to keep up with our email. But sometimes we get so many messages (100+ per day) that things get missed. Sorry about that! So, you may have to send a follow-up email if you have not heard back from us after about 24 hours (or by Monday afternoon if you send on a weekend). Assume this happened and just resend your email with something polite, like *Hi Steve, I’m just following up on my recent email. Looking forward to hearing back from you! Hannah*. We always assume you are working as best you can, we ask you to do the same for us. Here are some tricks to improve communication: 1) include Dr K and the TAs on your message rather than just one person, 2) reach out to the class GroupMe so your peers can see your question, 3) drop in to one of the many office hours we’re offering for a conversation in real-time.

Course Components and Grades:

Grades for this course will involve the following components; 1) engagement and participation with “in-class” prompts, 2) a collection of written 1-Page Papers, and 3) a Cosmic

Graded Course Components	Weight
In-Class Engagement/Participation	20%
Collection of Written 1-Page Papers	50%
Cosmic Calendar Video Project	30%

Calendar video documentary project that is our Signature Assignment. There will be no exams in this course. The portfolio of 1-Page Papers and the Signature Assignment will fulfill the requirement of a summative assessment in this course. Course letter grades will follow the traditional 90-80-70-60 format for A-B-C-D.

Course Objectives:

This course builds connections between the multiple perspectives, primarily those of astronomers and geologists – 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) use data – such as images, measurements, time lines, and observations of natural phenomena, (3) use writing to apply these perspectives to critically analyze and interpret the images and quantitative data, (4) communicate their work – through written papers and recorded video presentations – with an audience of educated non-expert peers.

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 and geologists, 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 papers, 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 source, including AI resources. 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 not be accepted after the due date/time and designated grace period except under extraordinary circumstances or with prior approval. If you miss a deadline by just a few minutes, email your paper to the instructor immediately and explain the situation. If you anticipate a problem meeting a deadline (job interview, travel, illness, etc) email the instructor to work out a solution prior to the deadline.

Assignment Submissions and Deadlines:

All work for this class must be submitted through our class D2L page by 5:00pm Arizona Time on the respective dates discussed in class and posted on D2L. To maintain fairness to all students (past, present, and future) no work will be accepted after the weekly deadlines have passed.

Honest Effort Eligibility for Paper Revisions:

First submissions of at least the first three 1-Page Papers are given a tentative grade along with comments/feedback. Revisions are then expected to address the feedback. In order to avoid the revision process being unfairly exploited, revisions can only be submitted if the following criteria are met: 1) A first submission is made by the original deadline, 2) the first submission is a complete response to each element of the prompt, including an SOS introduction, the required figures, the supporting-page and the AI page, and 3) a reasonably complete draft of your revisions is discussed with TA or the instructor during office hours. Only after all three conditions are met will the revision folder will be opened for submissions.

Class Engagement and Participation:

Regular engagement and effective participation are essential to do well in this

course. Regardless of your level of engagement, you are responsible for remaining aware of class activities and due dates.

If you must miss significant time during the course, you should contact the Dean of Students Office DOS-deanofstudents@email.arizona.edu to share documentation and to help arrange accommodations with the instructor.

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**.

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. If you have ideas for an honors contract please see the instructor during office hours.

Makeup Policy for Students Who Enroll Late:

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

Required “Out-Of-Class” Activities:

In addition to the written paper assignments, the Signature Assignment project will require many hours of work outside of the “normal” class routine over the course of the semester.

Safety on Campus

For a list of emergency procedures for many types of incidents, please visit the website of the Critical Incident Response Team (CIRT): cirt.arizona.edu

Additional Syllabus Policies Applying to All University of Arizona Classes:

For an up-to-date list, [including policies on Academic Integrity, Accessibility and Accommodations](#), see: catalog.arizona.edu/syllabus-policies