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 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, Dept of Planetary Sciences
See class D2L page for our teaching team contact information and office hours

Class Logistics and Deadline Policy:

This is 7-Week asynchronous on-line class organized by Content Modules.
7-week classes can feel intense! They are a full semester of class work compressed into less than half the "normal" time. To help us all keep up with this fast pace, on-line materials (recordings and assignments) will be released on a weekly basis. Also, no work will be accepted after each weekly deadline has passed.

Content Modules (see D2L for detailed weekly schedule):

Module 1: Course Introduction and Our Early Understanding of Earth
Module 2: Beginner's Guide to Earth-Like Planets
Module 3: Making Earth-Like Planets
Module 4: Oceans, Atmospheres, and Gravity
Module 5: Tides, Time, and the Age of Earth
Module 6: Mars as an Alien Earth
Module 7: Venus as an Alien Earth
Module 8: Finding Planets around Nearby Stars
Module 9: Working with Light
Module 10: The Doppler Effect
Module 11: Telescopes
Module 12: Asteroids and Asteroid Impacts
Module 13: Extreme Habitability

Course Components:

Your work in this course will involve several components; 1) engagement and participation with "in-class" prompts based on the course content, 2) a collection of written 1-Page Papers, 3) a *Cosmic Calendar* video documentary project that is one of our Signature Assignment options, and 4) an *Alien Earths To-Scale* video documentary project that is another of our Signature Assignment options. There will be no exams in this course. Your portfolio of 1-Page Papers and your Signature Assignment will fulfill the requirement of a summative assessment in this course.

1-Page Written Papers:

There will be 6 total 1-Page Papers. The lowest grade on these 6 assignments will be dropped – meaning 5 will count in the 1-Page Paper category. However, failure to submit Paper #1 **will trigger an administrative drop from the class**. At least the first 3 of these 1-Page Papers can be revised and resubmitted for full points back after receiving a grade and feedback. However, revisions for a better grade require that the original submission meets the "Honest Effort" criteria below. See the D2L Content area under 1-Page Papers for guidelines and a free sample paper.

Division of Grade:

In this course each person designs their own customized weighting for the different components of the course from the allowed ranges listed at right. Total weighting must add up to 100%. Each component is described in detail on D2L. Selections will be made using a Google Survey posted on D2L. After the selection deadline passes all grading choices are final and cannot be changed. While there is a wide variety of possible combinations, three possible configurations are provided below as examples. Please use 5% increments like shown in these examples.

Graded Course Components	Weight
Mandatory Grading Choice/Reflection	5%
In-Class Engagement/Participation	0-20%
Collection of Written 1-Page Papers	35-50%
Cosmic Calendar Video Project	0-50%
Alien Earths To-Scale Video Project	0-50%

Example 1

Reflection	5%
In-Class	20%
1-Page Papers	35%
Cosmic Calendar	0%
A.E. To-Scale	40%
Total	**100%**

Example 2

Reflection	5%
In-Class	10%
1-Page Papers	50%
Cosmic Calendar	35%
A.E. To-Scale	0%
Total	**100%**

Example 3

Reflection	5%
In-Class	0%
1-Page Papers	50%
Cosmic Calendar	20%
A.E. To-Scale	25%
Total	**100%**

Final Letter Grade:

Course letter grades will follow the traditional 90-80-70-60 format for A-B-C-D.

Prerequisites and General Expectations:

While there are no formal prerequisites for this class it is expected that all UA students have a healthy foundation of writing and mathematics, including arithmetic and geometry. Generally, the university expectations across disciplines are for approximately 2-3 hours of effort out of class for each hour of class time. In the compressed time scale of a 7-week class this expected level of effort can feel intense for all of us!

Honest Effort Eligibility for Paper Revisions:

First submissions of the first few 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 reasonably 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 a TA or the instructor during office hours. Only after all these conditions are met will the D2L submission folder open for your revisions.

Course Communication: (adapted from a syllabus by Dr. Katy Prudic)

If email communication with the instructor or TA 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 as instructor, TAs, and students in several different classes – Steve is involved in 6!). Start your email with an appropriate salutation, such as *Hi Dr K* or *Hello Olivia*. It is professional and helps us to 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! You may have to send a follow-up email if you have not heard back from us after about 48 hours (or a bit more if you send on a Friday evening). Assume this happened and just resend your email with something polite, like *Hi Steve, I'm just following up on my recent message. 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 tips to improve communication: 1) include Dr K and all the TAs on your message rather than just one person, 2) reach out to the class GroupMe so your peers can see your question and respond, 3) drop in to one of the many office hours we're offering for a conversation in real-time.

Course Objectives:

This course builds connections between 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 presentation, 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.

Academic Integrity:

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 our work against on-line resources. Because of this check, those of us who do our own work and properly cite our sources of information will not have to compete with others who commit plagiarism. All written work for this class must be "in our own words" - this includes responses to in-class prompts, the 1-Page Papers, and the Signature Assignments. Any work that is copied from an AI tool like chatGPT will not receive credit and will be reported to the Dean of Students. When we use an AI tool for assistance and feedback, we need to be very careful by acknowledging this, properly citing the source of the AI tool, and maintaining the integrity of our writing being "in our own words."

Fairness in Deadlines:

To ensure fairness to everyone (past, present, and future classes), 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 and TAs immediately and explain the situation. If you anticipate a problem meeting a deadline (job interview, travel, lingering illness, etc) email us prior to the deadline.

Class Engagement and Participation:

Regular engagement and effective participation are essential to do well in this course. Anyone who hasn't engaged with Module 1 by the last day of the drop/add period will be administratively dropped in order to avoid issuing a W grade.

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 frankehonors.arizona.edu/academics/honors-contracts. 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 before the drop/add period ends will not need special accommodations because the first deadlines come several days after this date. Those several days can easily be used to get up to speed on the course. After the drop/add period passes, instructor permission is needed to enroll and at that time arrangements can be discussed if needed.

Required "Out-Of-Class" Activities and Effort:

In addition to the written 1-Page Papers, the Signature Assignment projects will require several hours of work outside of the "normal" class routine over the course of the semester. Generally, university expectations across disciplines are for approximately 2-3 hours of effort/activity out of class for each hour of class time. In the compressed time scale of a 7-week class this expected level of effort can feel intense for all of us!

Safety on Campus

For a list of emergency procedures for many types on 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**