



General Education

PTYS ASTR 170A1 'Alien Earths'

General Education Tier I NATS

Online

<https://d2l.arizona.edu/d2l/le/content/1493176/Home>

Instructor: Prof. Jessica Barnes (she/her), jjbarnes@arizona.edu

Introduction

Welcome to Alien Earths! This syllabus contains all of the logistical information about this general education course as well as the learning outcomes and objectives of the course. Please keep the syllabus handy and refer to it often.

Part 1: Course Curriculum

1.1. 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.

1.2. Expected Students 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 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, .PDF, Excel, Keynote/PowerPoint, and image/video editing apps.

1.3. Course Curricular Category and Attribute Description

This course is a GenEd Tier 1 Natural Sciences Building Connections course with the following attributes: Quantitative Reasoning and Writing.

1.4. Scheduled Topics/Activities

Below is the list of modules to be covered during the course.

Module	Topic
1	Earth as a planet
2	Earth-like planets
3	Making Earth-like planets
4	Oceans, atmospheres, gravity
5	Tides, time and the age of the Earth
6	Mars as an alien Earth
7	Venus as an alien Earth
8	Finding planets around nearby stars
9	Working with light
10	The Doppler Effect
11	Telescopes
12	Asteroids and asteroid impacts
13	Extreme habitability

1.5. Course Assessment Plan

Learning Opportunities Throughout the course

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, and (4) communicate their work – through written papers and recorded video presentations – with an audience of educated non-expert peers.

Signature Assignment and ePortfolio

The signature assignment demonstrates key learning outcomes from curricular categories and attributes. For this project, you will design and build a Cosmic Calendar following the techniques and models discussed in class and shown in the posted video examples. The purpose is to demonstrate the time scale of the history of Earth with accurate representations for the full age of our planet and of significant milestones in its evolution. Your project will include a narrated video of you guiding a tour through your Cosmic Calendar and applying it to questions about Venus, Mars, and Earth-like planets around other stars. At the completion of the class remember to upload your Signature Assignment to the GenEd ePortfolio.

Required Extracurricular 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.

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.

Part 2: Course Information

2.1. Instructor(s) and Course Sites

Virtual office hours will be hosted on Zoom and the times of office hours to be provided in the weekly announcements section on D2L.

Instructor

Dr. Jessica (Jess) Barnes

<https://www.lpl.arizona.edu/faculty/jessica-barnes>

Lunar and Planetary Laboratory, Kuiper Space Sciences Building, Rm 540

Email: jjbarnes@arizona.edu

Graduate teaching assistant

Dingshan Deng

Email: dingshandeng@arizona.edu

2.2. Course Communications

Online communication from the Teaching Team to Students will primarily be through D2L Course Announcements. Make sure you have the 'notifications' for these turned ON so that you do not miss them.

If email communication with the instructor or TA is needed, please use only your official UA email address (e.g., jjbarnes@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 teachers and students in several different classes). Always start your email with an appropriate salutation, such as Hi Dr Barnes or Hello Dingshan. 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! 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 Jess, I'm just following up on my recent email. Looking forward to hearing back from you! Cheers, David. 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 Barnes and the Dingshan on your message rather than just one person, or 2) drop in to one of the many office hours we're offering for a conversation in real-time.

2.3. Course Format and Session Structure

- This is 7.5-Week, 3-Credit, asynchronous on-line class organized by Content Modules
- On-line materials (recordings and assignments) will be released on a weekly basis
- In class engagement will occur through virtual interactions embedded in lecture videos
- Due dates for assignments will occur weekly
- No work will be accepted after each weekly deadline has passed

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, most 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.

2.4. Required Resources and Equipment

- All course materials necessary to complete the course will be provided via D2L
- Depending on the individual approach taken to address the goals of the Signature Assignment, students may need access to a printer

2.5. Student Success Resources

Please be aware of the various resources and support services available to you.

- [UA Academic policies and procedures](#)
- [Student Assistance and Advocacy information](#)
- [Counseling and Psych Services \(CAPS\)](#)
- [Other student support resources](#)

Part 3: Course Policies

While UA Policies apply to all courses, most courses have some course-specific policies. This segment differentiates between policies pertaining to course progress and completion and those pertaining to the classroom climate and community engagement.

3.1. Progress and Completion Policies

Late Enrollment

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.

Absence and Class 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.

Late Submissions and Revisions

All work for this class must be submitted through our class D2L page by 09:00 Arizona Time (PDT) 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.

Grading

Grades for this course will involve the following components: 1) engagement and participation via “in-class” prompts (using playposit), 2) a collection of written 1-Page Papers, and 3) a Cosmic Calendar video documentary project that is the Signature Assignment.

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

- Note that the 1-Page paper with the lowest grade will be dropped from the overall grade of the collection of 1-Page paper assignments.
- 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.
- Requests for [incomplete \(I\)](#) or [withdrawal \(W\)](#) must be made in accordance with University policies
- 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**.

Schedule for due dates:

- 1-page papers will be due weekly on Mondays @ 09:00 Arizona Time (PDT) unless otherwise communicated via D2L Announcements
- There are three components to the Cosmic Calendar Signature Assignment:
 - Planning Report due Friday 09/13 @ 09:00 Arizona Time (PDT)
 - Progress Report due Friday 09/27 @ 09:00 Arizona Time (PDT)
 - Cosmic Calendar Final project due 10/11 @ 09:00 Arizona Time (PDT)

Course letter grades will follow the traditional format:

- 90-100 % = A
- 80-90 % = B
- 70-80 % = C
- 60-70 % = D

3.2. Classroom Climate and Community Engagement

UA Policies and Student Resources

All UA courses adhere to the general UA Policies as stated on the institutional websites:

<https://catalog.arizona.edu/policies>. Please make yourself familiar with the Student Code of Academic Integrity and the protocol ensuring non-discriminatory, anti-harassment, non-threatening learning experiences.

Note that student records are kept confidential as per the [FERPA policy](#).

Subject to Change Statement

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