

GENERAL EDUCATION SYLLABUS TEMPLATE

PTYS/ASTR 170A1 & Alien Earths

General Education Study Area

Monday & Wednesday 9:30-10:45AM, Kuiper 308

Description of Course

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 perspective of astronomers, geologists, and historians. We look back at Earth's geologic 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 and Contact Information

- Instructor
 - Name: Dr. Jessica Barnes
 - Pronouns: She/her
 - Office: Kuiper 540
 - Tel: 520-621-2012, email: jjbarnes@arizona.edu
 - Webpage: <https://www.lpl.arizona.edu/faculty/jessica-barnes>
 - Office hours: Thursday noon-1PM (in-person) & via zoom outside of these hours by appointment via email
- Teaching assistant(s)
 - Name: Graduate student Kana Ishimaru
 - Pronouns: She/her
 - Office: Kuiper 332
 - Email: kana@arizona.edu
 - Webpage: <https://www.lpl.arizona.edu/PMRG/person/kana-ishimaru>,
 - Office hours: Wednesday 10:45-11:45AM (in-person) & via zoom outside of these hours by appointment via email
- D2L home/course page: <https://d2l.arizona.edu/d2l/home/1208883>

Course Format and Teaching Methods

Lectures, in-class activities, and in-class discussion

Course Objectives

During the course, students will:

- 1) Demonstrate the methodologies and knowledge that characterize the perspective of astronomers in the context of searching for planets orbiting around other stars in our galaxy – including how this astronomical perspective has changed over many generations of astronomers.
- 2) Demonstrate the methodologies and knowledge that characterize the perspective of geologists in the context of exploring Earth’s geologic record as well as those of other planets.
- 3) Synthesize the perspectives of astronomers and geologists to describe the importance of both space and time in finding truly Earth-like planets around other stars
- 4) Obtain their own data and critically analyze and interpret their observations, measurements, and quantitative data in the context of understanding Earth as a habitable planet.
- 5) Communicate with educated non-experts – through written essays and recorded video presentations – their analysis and interpretation of their own images and data as well as data provided from primary sources.

Expected Student Learning Outcomes*

Upon the completion of this course, students will be able to:

1. *Students will demonstrate the ability to utilize multiple perspectives and make meaningful connections across disciplines and social positions, think conceptually and critically, and solve problems*
2. *Students will demonstrate rhetorical awareness and writing proficiency by writing for a variety of contexts and executing disciplinary genre conventions of organization, design, style, mechanics and citation format while reflecting on their writing development.*
3. *Students will 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 (graphs, data tables, equations, oral presentations, or written reflections).*
4. Communicate a broad understanding of the evolution of Earth, Venus, and Mars over their 4.5-billion-year histories, as well as the techniques geologist and astronomers employ to develop and expand our understanding of this evolution.
5. Use the perspectives of time and space to apply our understanding of Earth/Venus/Mars to terrestrial planets orbiting distant stars to determine the likelihood of these planets being alien Earths (i.e., Earth-like).

*Outcomes updated with new General Education program language italics and non-italicized bullets pasted from new General Education approved course proposal.

Absence and Class Participation Policy

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

<http://catalog.arizona.edu/policy/class-attendance-participation-and-administrative-drop>

The UA policy regarding absences for any sincerely held religious belief, observance or practice will be accommodated where reasonable, <http://policy.arizona.edu/human-resources/religious-accommodation-policy>.

Absences pre-approved by the UA Dean of Students (or Dean Designee) will be honored. See:

<https://deanofstudents.arizona.edu/absences>

Participating in the course and attending lectures and other course events are vital to the learning process. As such, attendance is required at all lectures and discussion section meetings. Absences may affect a student's final course grade. If you anticipate being absent, are unexpectedly absent, or are unable to participate in class online activities, please contact me as soon as possible. To request a disability-related accommodation to this attendance policy, please contact the Disability Resource Center at (520) 621-3268 or drc-info@email.arizona.edu. If you are experiencing unexpected barriers to your success in your courses, the Dean of Students Office is a central support resource for all students and may be helpful. The Dean of Students Office is located in the Robert L. Nugent Building, room 100, or call 520-621-7057.

Course Communications

Updates and course information will be provided via announcements in D2L and via email.

Required Texts or Readings

All recommended texts will be provided in D2L under the textbook tab.

The main course text is **Langmuir, C.H. and Broecker, W., 2012. How to build a habitable Planet. In How to Build a Habitable Planet. Princeton University Press.** It will be made available via D2L in .pdf format, is available for download from the university library, or is available for purchase from Amazon.

Assignments and Examinations: Schedule/Due Dates

This course will involve several components:

- 1) weekly D2L participation quizzes based on the content for the week,
- 2) brief 1-page writing assignments (6 of these),
- 3) a signature project from a choice of two: *Cosmic Calendar Video Documentary* or the *Habitable Planet Mission Proposal*.

For due dates see the schedule below.

Writing Requirement

All Tier One and Tier Two General Education Courses are writing intensive. Writing assignments are incorporated into the course through homework assignments, in-class exercises, and signature assignment.

Writing activities for this course include approximately bi-weekly formal written essays in a style intended for an educated but non-expert audience using citations, figures, and captions; informal writing during in-class hands-on activities; or detailed scripts written to narrate video documentary projects.

The first three ~bi-weekly formal essays include a feedback and revision process. Likewise, preliminary documentary scripts/planet mission proposal are submitted as a progress-report and receive feedback before being used for the video narration.

Final Examination or Project

There is no final exam for this class. There will be two options for student signature projects. These are taken from previous successful runs of the course and are *Cosmic Calendar Video Documentary* or the *Habitable Planet Mission Proposal*. Students will select one of these to complete for their final/signature

project. As described above there will be opportunities to receive feedback on these signature projects prior to final grading.

Grading Scale and Policies

The Course Components will have the following weights:

- In-class participation 10%
- D2L quizzes 10%
- Written essays 30%
- Signature project 50%

Grading will follow the university scheme of: *A*: $\geq 90\%$, *B*: $\geq 80\%$, *C*: $\geq 70\%$, *D*: $\geq 60\%$, *E*: $< 60\%$. Final Letter Grades will be assigned as above and will be calculated to the nearest 0.1%. Extra-credit opportunities will be offered throughout the semester and will be posted on D2L.

Incomplete (I) or Withdrawal (W):

Requests for incomplete (I) or withdrawal (W) must be made in accordance with University policies, which are available at <http://catalog.arizona.edu/policy/grades-and-grading-system#incomplete> and <http://catalog.arizona.edu/policy/grades-and-grading-system#Withdrawal> respectively.

Dispute of Grade Policy

Students have a week after grades are posted to dispute a grade on a paper, project, or exam. Disputes should be addressed via email to jjbarnes@arizona.edu

Honors Credit

Students wishing to contract this course for [Honors Credit](#) should email Dr. Barnes to set up an appointment to discuss the terms of the contract.

Scheduled Topics/Activities

Week	Topic	Deliverable	Due date (all 5pm Tucson time & D2L submissions)
1	Syllabus & intro	Syllabus Quiz	08/26/22
2	Intro to habitable planets & solar system	Essay	09/02/22
3	Governing principles of the natural world	Quiz	09/09/22
4	Governing principles of the natural world	Essay	09/16/22
5	Birth of elements and life cycle of stars	Quiz	09/23/22
6	Meteorites: time capsules of the solar system	Essay	09/30/22
7	Building a solar system	Sig. Proj. Proposal	10/07/22
8	Geological timescales and formation of the Earth	Essay	10/14/22
9	Making Earth Habitable: plate tectonics	Quiz	10/21/22
10	Making Earth Habitable: element cycling & greenhouse gases	Essay	10/28/22
11	Making Earth Habitable: the rise of oxygen	Quiz	11/04/22
12	Destruction! Mass Extinctions	Essay	11/10/22
13	What's so interesting about Mars?	Quiz	11/18/22
14	Venus: Earth's twin & Ocean Worlds	-	-
15	Exoplanets & Life	Signature Projects	12/01/22
16	Anthropogenic world & class recap	-	-

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, reading a newspaper, making phone calls, web surfing, etc.). Students are asked to refrain from disruptive conversations with people sitting around them during lecture. Students observed engaging in disruptive activity will be asked to cease this behavior. Those who continue to disrupt the class will be asked to leave lecture or discussion and may be reported to the Dean of Students.

Some learning styles are best served by using personal electronics, such as laptops and iPads. These devices can be distracting to other learners. Therefore, students who prefer to use electronic devices for note-taking during lectures should use the left side of the classroom.

Threatening Behavior Policy

The UA Threatening Behavior by Students Policy prohibits threats of physical harm to any member of the University community, including to oneself. See <http://policy.arizona.edu/education-and-student-affairs/threatening-behavior-students>.

Accessibility and Accommodations

Recommended language is provided on the Disability Resource Center website: <http://drc.arizona.edu/instructors/syllabus-statement>.

Code of Academic Integrity

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. Students are expected to adhere to the UA Code of Academic Integrity as described in the UA General Catalog. See: <http://deanofstudents.arizona.edu/academic-integrity/students/academic-integrity>.

The University Libraries have some excellent tips for avoiding plagiarism, available at <http://new.library.arizona.edu/research/citing/plagiarism>.

Selling class notes and/or other course materials to other students or to a third party for resale is not permitted without the instructor's express written consent. Violations to this and other course rules are subject to the Code of Academic Integrity and may result in course sanctions. Additionally, students who use D2L or UA e-mail to sell or buy these copyrighted materials are subject to Code of Conduct Violations for misuse of student e-mail addresses. This conduct may also constitute copyright infringement.

Nondiscrimination and Anti-harassment Policy

The University of Arizona is committed to creating and maintaining an environment free of discrimination. In support of this commitment, the University prohibits discrimination, including harassment and retaliation, based on a protected classification, including race, color, religion, sex, national origin, age, disability, veteran status, sexual orientation, gender identity, or genetic information. For more information, including how to report a concern, please see <http://policy.arizona.edu/human-resources/nondiscrimination-and-anti-harassment-policy>

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.

Additional Resources for Students

UA Academic policies and procedures are available at <http://catalog.arizona.edu/policies>

Campus Health

<http://www.health.arizona.edu/>

Campus Health provides quality medical and mental health care services through virtual and in-person care.

Phone: 520-621-9202

Counseling and Psych Services (CAPS)

<https://health.arizona.edu/counseling-psych-services>

CAPS provides mental health care, including short-term counseling services.

Phone: 520-621-3334

The Dean of Students Office's Student Assistance Program

<http://deanofstudents.arizona.edu/student-assistance/students/student-assistance>

Student Assistance helps students manage crises, life traumas, and other barriers that impede success.

The staff addresses the needs of students who experience issues related to social adjustment, academic challenges, psychological health, physical health, victimization, and relationship issues, through a variety of interventions, referrals, and follow up services.

Email: DOS-deanofstudents@email.arizona.edu

Phone: 520-621-7057

Survivor Advocacy Program

<https://survivoradvocacy.arizona.edu/>

The Survivor Advocacy Program provides confidential support and advocacy services to student survivors of sexual and gender-based violence. The Program can also advise students about relevant non-UA resources available within the local community for support.

Email: survivoradvocacy@email.arizona.edu

Phone: 520-621-5767

Campus Pantry

Any student who has difficulty affording groceries or accessing sufficient food to eat every day, or who lacks a safe and stable place to live and believes this may affect their performance in the course, is urged to contact the Dean of Students for support. In addition, the University of Arizona Campus Pantry is open for students to receive supplemental groceries at no cost. Please see their website

at: campuspantry.arizona.edu for open times.

Furthermore, please notify me if you are comfortable in doing so. This will enable me to provide any resources that I may possess.

Preferred Gender Pronoun

This course affirms people of all gender expressions and gender identities. If you prefer to be called a different name than what is on the class roster, please let me know. Feel free to correct instructors on your preferred gender pronoun. If you have any questions or concerns, please do not hesitate to contact

me directly in class or via email (jjbarnes@arizona.edu). If you wish to change your preferred name or pronoun in the UAccess system, please use the following guidelines:

Preferred name: University of Arizona students may choose to identify themselves within the University community using a preferred first name that differs from their official/legal name. A student's preferred name will appear instead of the person's official/legal first name in select University-related systems and documents, provided that the name is not being used for the purpose of misrepresentation. Students are able to update their preferred names in UAccess.

Pronouns: Students may designate pronouns they use to identify themselves. Instructors and staff are encouraged to use pronouns for people that they use for themselves as a sign of respect and inclusion. Students are able to update and edit their pronouns in UAccess.

More information on updating your preferred name and pronouns is available on the Office of the Registrar site at <https://www.registrar.arizona.edu/>.

Confidentiality of Student Records

<http://www.registrar.arizona.edu/personal-information/family-educational-rights-and-privacy-act-1974-ferpa?topic=ferpa>

Subject to Change Statement

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