Habitable Planet

Last Updated: Mon, 08/18/2025

Course prefix: EAS

Course number: 1601

Section: A

CRN (you may add up to five):
80279

Instructor First Name: Christopher

Instructor Last Name: Reinhard

Semester: Fall

Academic year: 2025

Course description:

We live in an exciting and challenging time—the human species is dramatically reshaping the Earth system, while the search for life beyond Earth is advancing at incredible speed. This course will explore the history of the solar system and Earth as the one currently known example of a habitable planet—one that can support life as we know it. We will consider how stars, elements, and planets form, the important planetary processes that brought about the Earth as it was when life arose and have shaped its evolution as an inhabited planet over billions of years, and the science of searching for life beyond Earth. We will also explore the factors that shape the planet we live on today, and some of the physical and societal drivers that will potentially govern its future. This course is geared toward undergraduate students, and is meant to be both challenging and broadly accessible. The course will draw upon lectures and readings, as well as laboratory exercises to enrich those lessons.

Course learning outcomes:

Explore scientific reasoning and the scientific method

- Acquire a working understanding of science as a process, levels of confidence in scientific inquiry, and practical constraints on establishing scientific "truth."

Understand the origin of the Universe and the building blocks of planets

- Explore evidence for the age of the Universe, its evolution over time, and its long-term fate.
- Develop grounding in the processes controlling the emergence of matter.

- Acquire an understanding of the processes that drive the formation of planetary systems.

Explore what makes a planet "habitable"

- Explore empirical methods for finding a characterizing planets outside the Solar System.
- Acquire a basic understanding of key processes that control planetary climate.
- Examine the factors controlling whether planets can be suitable for life.

Explore the evolution and future of life on Earth

- Acquire a broad perspective on the uniqueness of Earth as a habitable planet
- Understand the building blocks of life as we know it, and the factors that drive evolutionary change in Earth's biosphere.
- Engage with the implications of the human species as a critical component of the Earth system.

Required course materials:

Lecture:

- We recommend (but do not require) the text: *Langmuir, C. and W. Broecker (2012): How to Build a Habitable Planet: The Story of Earth from the Big Bang to Humankind, 2nd Edition, Princeton University Press; ISBN-13: 978-0691140063.*

Lab:

- Argos ($40): This is an adaptive learning platform hosting course content directly integrated with the Lab Canvas site.

Grading policy:

Graded Materials:

- ARGOS Assignments [7 | equally weighted | lowest two scores dropped]: 25% of final grade
- Laboratory Modules: 35% of final grade
- Midterm Assessments [3 | equally weighted]: 40% of final grade

Grading Scale:

- A ≥ 90.0%
- B ≥ 80.0% and < 90.0%
- C ≥ 70.0% and < 80.0%
- D ≥ 60.0% and < 70.0%
- F < 60.0%

Attendance policy:

Attendance and participation are critical for fully engaging with the course material, and all students are expected to attend class in person. All graded materials, including quizzes and laboratory modules, are completed in person with no exceptions. Limited exceptions are allowed for Institute-approved absences (for example, those documented by the Registrar) and situations such as hospitalization or family emergencies (documented by the Office of the Dean of Students).

Academic honesty/integrity statement:

Students are expected to maintain the highest standards of academic integrity. All work submitted must be original and properly cited. Plagiarism, cheating, or any form of academic dishonesty will result in immediate consequences as outlined in the university's academic integrity policy.

Core IMPACTS statement(s) (if applicable):

This is a Core IMPACTS course that is part of the STEM area.

Core IMPACTS refers to the core curriculum, which provides students with essential knowledge in foundational academic areas. This course will help master course content, and support students’ broad academic and career goals.

This course should direct students toward a broad Orienting Question:

- How do I ask scientific questions or use data, mathematics or technology to understand the universe?

Completion of this course should enable students to meet the following Learning Outcomes:

- Students will use the scientific method and laboratory procedures or mathematical and computational methods to analyze data, solve problems and explain natural phenomena.

Course content, activities and exercises in this course should help students develop the following Career-Ready Competencies:

- Inquiry and Analysis
- Problem-Solving
- Teamwork