

Introduction to Astrobiology: PHY 372 - Spring Semester 2013

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Textbooks:

How to Find a Habitable Planet by James Kasting - required

Extrasolar Planets and Astrobiology by Caleb Scharf - optional

In this class, we will examine the study of life in the universe. This subject involves the fields of physics, astronomy, chemistry, biology, geology, and earth sciences, but we will focus primarily on the material from a perspective of astronomy and physics.

Astrobiology can ask a number of questions, including: How did life originate on Earth? Is there life on other planets in our solar system? Although we will spend some time on those questions, we will primarily focus on the question of what environments might be suitable for life on planets outside our solar system, how to find such life. We will learn about the current state of knowledge of extrasolar planets, with a special focus on learning what is technologically possible and practical in the search for life.

Format: The classes will consist of 90-minute sessions, with lectures, discussions, and presentations.

Student Work and Grading

The primary requirement for students taking the class is attendance. There will be one individual research project for each student, which will yield both a written report (4 pages minimum) and an in-class presentation. Students taking the 2-credit version of the class will be required to complete between 3 and 5 homework assignments.

Grading:

1-credit

Attendance and participation - 50%

Project paper - 25%

Project presentation - 25%

2-credit

Attendance and participation - 50%

Project paper - 20%

Project presentation - 15%

Homework assignments - 15%

Week 1: Class structure, expectations, grading. Intro to exoplanet studies and the scope of astrobiology

Week 2: Detecting exoplanets

Week 3: Characteristics and demographics of exoplanets

Week 4: Defining habitability - the circumstellar habitable zone

Week 5: Defining habitability - nonstandard habitable zones

Week 6: Defining habitability - other factors

Week 7: Life on Earth - Physical history

Week 8: Life on Earth - Biological history

Week 9: Presentations + Detecting life: biosignatures

Week 10: Presentations + Detecting life: observational capabilities

Week 11: Presentations + Abiogenesis, search for life in the solar system

Week 12: Presentations + Near-term and long-term prospects for detecting ET life