

ASTRONOMY 475/575 – Planetary Astrobiology  
Spring 2019

**Class meets:** T/Th 2:00 pm - 3:15 pm

**Classroom:** Steward Observatory Room 204

**Instructors:** Dr. Daniel Apai, Dr. Josh Eisner

**Office:** Steward Observatory Rooms N208B and N414

**Phone:** 621-6534, 626-7645

**Email:** [apai@email.arizona.edu](mailto:apai@email.arizona.edu) [jeisner@email.arizona.edu](mailto:jeisner@email.arizona.edu)

**Office Hrs:** By appointment or whenever the door is open

### **Course Description**

This course will explore the processes related to planet formation, the properties of planets and the planetary conditions required for the emergence of life. We will study the formation of our Solar System and exoplanetary systems, the distribution and properties of exoplanets, and the potential habitability of other planets/moons in our system or extrasolar systems. The course will also review science cases and possible future astrobiology studies, both *in situ* and via remote sensing, of astrobiologically relevant environments. Toward the end of the semester a few guest lectures will highlight particularly exciting and timely topics.

### **Textbook and Readings**

There is no required book for this course. For those who would like some additional reading material, we recommend “Planetary Science” by Lissauer and de Pater, and “Earth” by Lunine. Copies should be available in the campus bookstore. Draft lecture notes will be made available on the course website. Some topics are beyond the scope of these sources, and we will draw from journal articles and other sources in these cases. We will also assign several journal articles as required reading.

### **Lectures**

The classes will be devoted to lectures. Professor Eisner will lecture for the first 6 weeks or so, and then Professor Apai will lecture for about 6 weeks. Toward the end of the semester, both professors and guest lecturers will highlight particularly interesting or timely astrobiology topics. The final lecture(s) will be devoted to student group presentations of astrobiology mission concepts.

### **Homework and Classwork**

There will be approximately six homework assignments during the semester, which will consist of problems that should be completed individually. Some assignments will contain one or more advanced questions for graduate students only. All assignments will be due *at the beginning of class on Tuesdays*.

In addition, students will be assigned relevant papers on a rotating basis, with one presentation per week. Each student will give up to two presentations during the semester.

At the end of the semester students will form small groups and collaboratively develop concepts/proposals for competing astrobiology missions. These concepts will be described and debated in class toward the end of the semester.

### **Exams**

There will be a final exam. This exam will cover material discussed in lecture as well as in the homework.

### **Grading**

The grades will be computed as follows:

Homework	30%
Presentation of assigned papers	10%
Mission Concept Debate	30%
Final Exam	30%

Grades may be adjusted to reflect overall class performance, but as a general rule letter grades will correspond to number grades as follows:

A	>90%
B	80%-90%
C	70%-80%
D	60%-70%
E	<60%

### **Topic Schedule and Corresponding Reading**

A preliminary plan for the topics to be discussed is included on the course website.

### **Course Website**

<http://www.u.arizona.edu/~jeisner/astr575.html>

### **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>

### **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: <https://deanofstudents.arizona.edu/academic-integrity/students/academic-integrity>

### **Students with Disabilities**

Our goal in this classroom is that learning experiences be as accessible as possible. If you anticipate or experience physical or academic barriers based on disability, please let me know immediately so that we can discuss options. You are also welcome to contact the Disability Resource Center (520-621-3268) to establish reasonable accommodations. For additional information on the Disability Resource Center and reasonable accommodations, please visit <http://drc.arizona.edu>.

### **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>.

### **UA Nondiscrimination and Anti-harassment Policy**

The University is committed to creating and maintaining an environment free of discrimination; see <http://policy.arizona.edu/human-resources/nondiscrimination-and-anti-harassment-policy>

*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.*