PTYS170B2 Universe and Humanity:

Exploring Our Place in Space

Exploring Perspectives/Quantitative Reasoning and Writing

Kuiper Space Sciences Room 308, Tue/Thu 11:00am-12:15pm

Description of Course

This course places the Earth and humanity in a broad cosmic context and seeks to answer fundamental questions about our surroundings. Where are we and where do we come from? What is matter made of and what processes created it? What are different types of stars like and where does our Sun fit in? What is the role of stars in shaping the cosmos and the planets orbiting them? How did the Sun, the Earth, and the other planets in the solar system form? What are the planets in the solar system like and are there other planetary systems like ours? In addition to exploring these questions, this course will help students to understand how we have arrived at our current view of the universe, with a focus on the scientific method and the principles of nature as we understand them today.

Instructor and Contact Information

Tommi Koskinen, Kuiper Space Sciences (KSS) 421, tommik@arizona.edu

Office Hours: 12.15-1.15pm Tuesday and Thursday (or by appointment)

https://www.lpl.arizona.edu/faculty/tommi-koskinen

Graduate Teaching Assistants

Michael Daniel, mfdaniel@arizona.edu

Office Hour: TBD

Fuda Nguyen, fudanguyen@arizona.edu

Office Hour: TBD

Course Format and Teaching Methods

Lectures, individual and small group activities, signature assignments, homework assignments, quizzes, demonstrations

Course Objectives

During this course, the students will explore the key physical and chemical processes that govern the physical universe and our surroundings from the perspectives of astronomers and planetary scientists through instruction, experiments, and other demonstrations. They will examine and interpret observations and models to critically evaluate the scientific evidence that supports our current view of the Earth and the solar system, and their place in the cosmos. They will understand the evolution of the scientific method and our view of the universe through examples from astronomy and planetary science. The goal of this course is to explore the principles of nature, the solar system, and the universe as we understand them today, based on the most up-to-date observations and models.

Learning Outcomes

This course aims to provide a qualitative foundation in astronomy and planetary science to facilitate further study or interest. The students will develop an understanding of the basic physical and chemical processes that shape our surroundings and learn to apply this knowledge to the study of astronomy and planetary science. They will be able to explain the fundamental concepts and major current topics in these fields, and describe the place of the Earth and humanity in the cosmic context. They will be able to demonstrate their knowledge by writing about topics in astronomy and planetary science in their own words. They will also learn the basis of the scientific method and will be able to apply it to interpret observational data and design experiments.

Course Communications

Online communication will be conducted through D2L.

Recommended textbook

The Cosmic Perspective (10^{th} edition) by Jeffrey O. Bennett, Megan O. Donahue, Nicholas Schneider, and Mark Voit (Pearson, 2024)

Required Extracurricular Activities

The course includes a signature assignment that includes tasks outside of class. More information about the signature assignment is available through the course D2L page.

Assignments and Examinations: Schedule/Due Dates

There are four homework assignments, three quizzes, and a signature assignment. The current schedule of due dates for homework and components of the signature assignment (SA) is:

- #1P: September 14
- #1: September 28
- #2: October 12
- #3: October 26
- #4: November 16
- SA: September 7: SA topic selection
- SA: December 7: SA report

The anticipated schedule of quizzes is:

- #1: September 25
- #2: October 30
- #3: December 16 (10.30am-12.30pm)

Updates to the schedule will be communicated in class and posted on D2L.

Final Examination

The final quiz for this class is scheduled for 10.30am-12.30pm on December 16 in KSS 308.

Grading Scale and Policies

Homework: 30%

Quizzes: 30%

Signature assignment: 20%

In-class assignments and participation: 20%

A: 90-100

B: 80-89.9

C: 70-79.9

D: 50-69.9

E: <50

There will be opportunities for extra credit that will be announced during the semester.

University policy regarding grades and grading systems is available at https://catalog.arizona.edu/policy/courses-credit/grading/grading-system

Requests for incomplete (I) or withdrawal (W) must be made in accordance with University policies, which are also available at https://catalog.arizona.edu/policy/courses-credit/grading/grading-system

Honors Credit

Students wishing to contract this course for Honors Credit should email the instructor to set up an appointment to discuss the terms of the contract. Information on Honors Contracts can be found at https://honors.arizona.edu/academics/honors-contracts.

Scheduled Topics/Activities

The anticipated class schedule is as follows:

Week 1: The Earth and the Cosmos
Week 2: Principles of nature
Week 3: Observing the solar system
Week 4: Special and general relativity
Week 5: Quiz#1
Week 6: Quantum oddities, light and matter
Week 7: The Sun and the stars
Week 8: Big Bang – the birth of the Universe
Week 9: The origin of the solar system
Week 10: Quiz#2
Week 11: Rocky planets in the solar system
Week 12: History of the Earth
Week 13: Earth and Mars
Week 14: The outer solar system
Week 15: Extrasolar planets
Week 16: Conclusion

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.

The use of laptops, iPads, and other such mobile devices is not permitted in class for any other purposes other than those directly related to the course (in-class activity or note taking).

Class recordings

For lecture recordings and materials, which are used at the discretion of the instructor, students must access content in D2L only. Students may not modify content or re-use content for any purpose other than personal educational reasons. All recordings and materials are subject to government and university regulations. Therefore, students accessing unauthorized recordings or using them in a manner inconsistent with UArizona values and educational policies (Code of Academic Integrity and the Student Code of Conduct) are also subject to civil action. Other materials available through D2L must not be distributed in public without explicit permission.

Absence and Class Participation Policy

The UA's policy concerning Class Attendance, Participation, and Administrative Drops is available at: https://catalog.arizona.edu/policy/courses-credit/courses/class-attendance-participation

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: http://policy.arizona.edu/employmenthuman-resources/attendance

Participating and attending lectures and other course events are vital to the learning process. The lectures cover material that is not included in the textbook and include in-class assignments and clicker questions.

Safety on Campus and in the Classroom

For a list of emergency procedures for all types of incidents, please visit the website of the Critical Incident Response Team (CIRT): https://cirt.arizona.edu/case-emergency/overview

Also watch the video available at https://arizona.sabacloud.com/Saba/Web_spf/NA7P1PRD161/common/learningeventdetail/crtfy0000000000003560

University-wide policies link

Links to the following UA policies are provided here, https://academicaffairs.arizona.edu/syllabus-policies:

- Threatening Behavior Policy
- Accessibility and Accommodation Policy
- Code of Academic Integrity
- Nondiscrimination and Anti-Harassment Policy
- Subject to Change Statement