Exploring Our Solar System
Planetary Sciences 206 (PTYS/ASTR 206)
GenEd: Exploring Perspectives - Natural Scientist, GenEd: Quantitative Reasoning,
GenEd: Writing, PTYS Minor Elective
Kuiper 308, TTh 11:00-12:15

Instructor:
Dr. Kristopher G. Klein, Kuiper Space Sciences 431; kgklein@arizona.edu
Office Hours: Tuesday: 2-3pm; Wednesday: 10 - 11am (or by arrangement)

Graduate Teaching Assistants:
Adam Battle, Kuiper Space Sciences 322; adambattle@arizona.edu
Office Hours: Monday 1pm

Jose Daniel Castro Cisneros, Kuiper Space Sciences 301; jdcastrocisneros@arizona.edu
Office Hours: Thursday 4-5pm

Preceptor:
Ash Abbate; abbate@arizona.edu
Office Hours: Wednesday: 1-2pm; Kuiper 330

This course will use a D2L website for assignments, lecture notes, and communications. Email communications with any of the instructors the should include **PTYS 206** and the student's name in the subject line and be from your UA email address; we will endeavor to respond to emails within one business day. This class is scheduled to be taught in the in person modality.

As this is a three credit course, there is an expectation of 90 hours of reading, homework, and other studies to be done by the student outside of lecture.

Course and Learning Objectives

A one-semester survey of how and why we have explored our solar system.

Our Solar System is filled with an incredible diversity of objects. These include the Sun and planets, as well as a cornucopia of of moons—some with exotic oceans, erupting volcanoes, or dynamic atmospheres. Billions of asteroids and comets inhabit the space between and beyond the planets. Each body is unique, and has followed its own evolutionary history. This class will explore our current understanding of the Solar System and emphasize similarities that unite the different bodies as well as the differences between them. We will develop an understanding of physical processes that occur on these bodies, including tectonics, impact cratering, volcanism, and processes operating in their interiors, oceans, and atmospheres. We will also discuss planets around nearby stars and the potential for life beyond Earth. Throughout the class, we will highlight the leading role that the University of Arizona has played in exploring our Solar System.

During the course, students will learn about:

- The properties and histories of the star, planets, and moons in the solar system.
- The tools we have used to study the solar system and planetary systems beyond ours.

- The history of planetary exploration missions.

Learning Outcomes:

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

- Communicate through writing a broad historical and modern understanding of our solar system.
- Describe the methodologies astronomers and planetary scientists use to study solar systems.
- Demonstrate competency in a using a variety of software for compiling and analyzing quantitative information and conveying that information to a variety of audiences.

Texts and Course Materials

The course will involve readings from a variety of sources that will be posted on D2L. Two texts we will frequently refer to are **Introduction to Planetary Science: The Geological Perspective**— available for free here— and **How to Build a Habitable Planet** available here.

Writing Requirement

All Tier One and Tier Two General Education Courses are writing intensive (see here). In this course, the written homework will provide you with the opportunity to more deeply engage with the sugject matter. This course is also a General Education Writing Attribute Course. Writing enters into many aspects of this course, including short written responses in the in-class activities, the homeworks, and a longer final project as the Writing Attribute Signature Assignment. The Signature Assignment will go through one cycle of peer review by a fellow student and revision prior to final submission.

Homework

There will be six written homework assignments throughout the semester, each worth 10% of the overall course grade. Assignments will be posted in advance on the D2L website. Each homework will have at least one week for completion from posting, then they will be graded and returned to you within a week. You may discuss the homework with other students, but be sure the final work is yours. Do not let others copy your homework; it could result in your getting flagged for plagiarism, and **you receiving a zero for the assignment.**

Late Homework

No late homework will be accepted *except in very exceptional cases.* For scheduled absences like religious holidays and university travel, the homework can be downloaded from D2L in advance so that it can be turned in early, and there is no reason for a due-date extension. In cases of a sudden family or medical emergency, late homework **may** be accepted, but only before the graded homework is returned and solutions posted.

Exams

There will be no exams in this course, with the evaluations arising from homeworks, in class activities, and the signature assignment serving as the quantitative assessment of your learning.

Extra Credit

There will be several opportunities for extra credit, including a presentation for the class as well as attending and reflecting on the series of three LPL Evening Lectures that are presented on Wednesday evenings throughout the Fall. See the postings on D2L for the details on these opportunities.

Final Project/Signature Assignment

This course will have a final writing project that serves as the course signature assignment. The project that will involve researching material related to the course and applying this information to produce a four-page research paper as well as a 10 minute recording providing an overview of your project.

There will be due dates throughout the semester for selecting and proposing a topic, turning in a draft for peer feedback and the opportunity to revise and resubmit, and final submission of the report.

All elements of the final project will be turned in on D2L **in pdf format**, where it will be checked for plagiarism. All components of the final project will be worth 30% of the total course grade.

Lectures and Class Participation

Most lectures will be presented by Dr. Klein, although occasionally a guest lecturer may lead the class. The lecture notes and associated readings will be placed on D2L before the class. Lectures will be interactive, including participation in the form of questions and class discussion. 10% of the course grade will be awarded for completing in class activities, quantified by post-lecture reflection quizes. The lowest five grades for these quizes will be dropped at the end of the semester.

Grading Scale & Policies

The individual grading elements will have the following weights:

Final Project: 30%	Homework: 60%	Class Participation: 10%

Final Letter Grades will be assigned as follows, and will be calculated to the nearest 0.1%. A curve may be considered, depending on the observed distribution of scores at the end of the semester.

A: $\geq 90\%$	B: $\geq 80\%$	C: $\geq 70\%$	D: $\geq 60\%$	E: $< 60\%$

University policy regarding grades and grading systems is available here. Requests for incomplete (I) or withdrawal (W) must be made in accordance with University policies, which are available here and here respectively.

Makeup Policy for Late Registering Students

Students who register by the end of the second week of class may be given an opportunity to make up missed assignments within a reasonable amount of time, to be mutually agreed upon by the student and instructor.

Regrades

All your work will be graded by Dr. Klein or the Graduate Teaching Assistants. Although we will make every effort to evaluate your work thoroughly and fairly, we may err. If you think there is an error in grading your homework, please contact Dr. Klein; I will look at your work again and return it to you with a response, usually within a week. **You must report any grading errors within a week of the return of your assignment to receive a regrade.**

Questions & Concerns

It is very important that you let the instructor know about any concerns about any aspect of the class as soon as they arise. There are many ways to contact us about questions or concerns about the course material and your grade. Weekly office hours are the best place to ask questions and get help. You are also welcome to talk to me after class, or you can make an appointment to meet with me outside of office hours if that works better.

Classroom Attendance

If you feel sick, or may have been in contact with someone who is infectious, stay home. Except for seeking medical care, avoid contact with others and do not travel. Notify your instructor if you will be missing a course meeting or an assignment deadline. Non-attendance for any reason does not guarantee an automatic extension of due date or rescheduling of examinations/assessments. Please communicate and coordinate any request directly with your instructor. If you must miss the equivalent of more than one week of class, you should contact the Dean of Students Office (`DOS-deanofstudents@email.arizona.edu`) to share documentation about the challenges you are facing.

Academic Advising

If you have questions about your academic progress this semester, please reach out to your academic advisor (`https://advising.arizona.edu/advisors/major`). Contact the Advising Resource Center (`https://advising.arizona.edu/`) for all general advising questions and referral assistance. Call 520-626-8667 or email to `advising@.arizona.edu`

Life Challenges

If you are experiencing unexpected barriers to your success in your courses, please note the Dean of Students Office is a central support resource for all students and may be helpful. The Dean of Students Office can be reached at (520) 621-2057 or `DOS-deanofstudents@email.arizona.edu`.

Physical and mental-health challenges

If you are facing physical or mental health challenges this semester, please note that Campus Health provides quality medical and mental health care. For medical appointments, call (520) 621-9202. For After Hours care, call (520) 570-7898. For the Counseling & Psych Services (CAPS) 24/7 hotline, call (520) 621-3334.

Classroom Behavior Policy

We all have a shared responsibility to create a positive learning environment free from distractions. If you arrive late to class or need to leave early, please choose a seat on the aisle and enter/exit quietly. Please silence your phone during class. If you need to accept an emergency phone call, exit the lecture hall fully before talking on the phone. Behaviors that could be disruptive to other students are not acceptable and disruptive students will be asked to leave. Examples of potentially disruptive behaviors making phone calls, web surfing, watching videos, or reading a newspaper.

Department policy *forbids any outside food or drink, except water, in the lecture hall.*

The UA Threatening Behavior by Students Policy prohibits threats of physical harm to any member of the University community, including to oneself.

UA Academic policies and procedures are available here. Student Assistance and Advocacy information is available here.

Accessibility & Accommodations

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 contact Dr. Klein and the Disability Resource Center (520-621-3268) so that reasonable accommodations can be arranged. Additional information on reasonable accommodations can be found at the Disability Resource Center.

Code of Academic Integrity

Students are encouraged to share intellectual views and discuss freely the principles and applications of course materials. However, graded work and 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.

Student who plagiarize will get a zero for the assignment.

If you have questions about how to cite sources or plagiarism, please talk to the instructor. The UA libraries also provide references on the distinction between citation and plagiarism.

Use of Artificial Intelligence Tools

In this course you are welcome to use generative artificial intelligence/large language model tools, e.g. ChatGPT, Dall-e, Bard, Perplexity. Using these tools aligns with the course learning goals "Demonstrate competency in a using a variety of software for compiling and analyzing quantitative information and conveying that information to a variety of audiences."

AIs/LLMs may make up or hallucinate information. These tools may reflect misconceptions and biases of the data they were trained on and the human-written prompts used to steer them. **You are responsible for checking facts, finding reliable sources for, and making a careful, critical examination of any work that you submit.**

Your use of AI tools or content must be acknowledged or cited. If you do not acknowledge or cite your use of an AI tool, what you submit will be considered a form of cheating or plagiarism. Please use guidelines for acknowledging/citing generative AI in your assignments. e.g. found here.

Honors Credit
Students wishing to contract this course for Honors Credit should email Dr. Klein to set up an appointment to discuss the terms of the contact.

UA Nondiscrimination and Anti-Harassment Policy
The University is committed to creating and maintaining an environment free of discrimination. The classroom is a place all are encouraged to ask questions and express well-formed opinions and their reasons for those opinions. We want to create a tolerant and open environment where comments and questions can be expressed without resorting to bullying or discrimination of others.

Confidentiality of Student Records
Student records, including grades, will be handled according to FERPA guidelines.
Please contact Dr. Klein yourself if you have questions about grades.

Subject to Change Statement
All information presented 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.

University-Wide Policies
Policies established by UA regarding *Absence and Class Participation*, *Threatening Behavior*, *Accessibility and Accommodations*, *Code of Academic Integrity*, and *Nondiscrimination and Anti-Harassment* can be found at the Academic Affairs website.

COVID-19
Please consult the University's COVID-19 website for the latest information. Any changes to this course's schedule, modality, or meeting location will be communicated through D2L.

Voluntary, free, and convenient COVID-19 testing is available for students on Main Campus and the COVID-19 vaccine is available for all students at Campus Health.

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): here. Also watch the video available here.

Class Recordings
For lecture recordings, which may be 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 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.

Week	Lecture	Date	Topic	Notes	Lecture	Date	Topic	Notes
1	1	August 22	Time and Distance		2	August 24	Motion	
2	3	August 29	Forces		4	August 31	Energy	HW#1 Due
3	5	September 5	Light	Guest Lecture (ISSI)	6	September 7	Stars	Guest Lecture (ISSI)
4	7	September 12	Stellar Formation		8	September 14	Planetary Formation	HW#2 Due
5	9	September 19	Temperatures and Atmospheres		10	September 21	The Sun	Mission Proposal Due
6	11	September 26	The Heliosphere		12	September 28	Mercury	HW#3 Due
7	13	October 3	Venus		14	October 5	Earth	
8	15	October 10	Magnetosphere		16	October 12	The Moon	HW#4 Due
9	17	October 17	Mars		18	October 19	Peer Review	Mission Draft Due
10	19	October 24	Jupiter		20	October 26	Saturn	HW#5 Due
11	21	October 31	Space Situational Awareness	Guest Lecture (APS DPP)	22	November 2	Kuiper Belt Objects	Guest Lecture (APS DPP)
12	23	November 7	Uranus & Neptune		24	November 9	Moons of Gas Giants	HW#6 Due
13	25	November 14	Exoplanet Detection	Mission Presentations Due	26	November 16	Exoplanet Characteristics	
14		November 21	Final Project Due	No Class		November 23	Thanksgiving	No Class
15	27	November 28	Exobiology		28	November 30	Rockets	
16	29	December 5	The Space Race	Last Day of Class				

Figure 1: Preliminary Course Schedule for Fall 2023 offering of PTYS206.

Approx. Course Schedule & Due Dates

The planned course schedule is listed in Fig. 1, and on the online calendar here. Changes and updates will be announced in class and on D2L.