

PTYS/GEOS 270: Planetary Geoscience

Lectures: In person, Kuiper Space Sciences, Rm. 312, Tue-Thu 12:30-13:45.

Description

The course introduces to the students the formation and evolution of solar system with a focus on its major bodies—major body evolution and their landforms resulted by geological activities, impact cratering, planetary volcanisms, aeolian and fluvial processes, planetary volatile reservoirs and astrobiological perspectives.

Course prerequisites

GEOS 251 Physical Geology.

Instructor and contact information

Dr. Stefano Nerozzi, instructor, nerozi@arizona.edu

Office Hours (open door): Sonett building, Rm. 10G Fri 10:00-12:00.

Additional office hours are available upon request.

Course format and teaching methods

Lectures, small-group in-class activities and discussion, individual and team projects.

Course Objectives

The course objectives are (1) to gain an understanding of the geologic properties and processes governing the major planetary bodies in the solar system, and (2) to learn how to identify and address key questions in planetary geoscience across the solar system.

Expected Learning Outcomes

Students will learn to:

- Identify planets and other classes of planetary bodies in the solar system and describe their key features through the geologic lens.
- Relate the chemical makeup and physical properties of planetary bodies to their geologic history.
- Explain the major geologic processes governing planetary surfaces and interiors.
- Solve quantitative problems related to planetary geologic processes and properties.
- Find and explore planetary science datasets.
- Identify and tackle open science questions in the broader field of planetary geoscience.

Lectures:

There will be two lectures per week during which we will explore a variety of planetary geoscience topics using presentations, whiteboard illustrations and derivations, and small group exercises. Students are encouraged to ask questions during the lecture. A small group (2-3) of students, guided by the instructor, will summarize the materials covered in preceding lectures in the 5 minutes at the beginning of each class. Presentation materials will be posted on D2L after each lecture.

Makeup policy for students who register late

Please contact the instructor.

Course communications

D2L & in-class announcements.

Required textbook/materials

No textbook is required. Reading assignments will include publicly available documents such as the Planetary Science Decadal Survey, planetary science goals documents (e.g., 2025-2026 NASA Science Plan, VEXAG Science Goals, etc.), peer-reviewed journal articles, white papers, etc.

Suggested textbooks

Introduction to Planetary Science: The Geological Perspective by Gunter Faure & Teresa Mensing.

Freely available through the UA library:

https://arizona-ua.primo.exlibrisgroup.com/permalink/01UA_INST/1mtjguq/alma991048847244003843

Required materials

Students should have writing tools (pen, pencil), calculator, paper. The instructor will inform you if additional materials will be required for any given lecture or exam session.

Scheduled topics and activities:

Tuesday lectures	Thursday lectures	Quiz/Assignment due
	Jan 15: Class introduction	Questionnaire
Jan 20: Solar System overview	Jan 22: Terrestrial planets	None
Jan 27: Moons	Jan 29: Other bodies	Jan 30: Quiz
Feb 3: Mercury	Feb 5: Mercury	Feb 6: Assignment 1
Feb 10: Venus	Feb 12: Venus	Quiz
Feb 17: Moon	Feb 19: Moon	Feb 20: Assignment 2
Feb 24: Mars	Feb 26: Mars	Quiz
Mar 3: Jupiter's moons	Mar 5: Jupiter's moons	Mar 6: Assignment 3
Mar 10: Spring break	Mar 12: Spring break	None
Mar 17: Mars (invited)	Mar 19: Moon (invited)	Mar 20: Assignment 4
Mar 24: Exam	Mar 26: Asteroid belt & small bodies	Quiz
Mar 31: Saturn's moons	Apr 2: Saturn's moons	Apr 3: Assignment 5
Apr 7: Uranus & Neptune's moons	Apr 9: Uranus & Neptune's moons	Quiz
Apr 14: Pluto and Charon	Apr 16: KBOs, comets	Apr 17: Assignment 6
Apr 21: Astrobiology	Apr 23: Exoplanets	Quiz
Apr 28: Team presentations	Apr 30: Team presentations	Presentations
May 5: No class, project writeup	May 7: No class, project writeup	Final project writeup

Quizzes

Quizzes will be released on D2L every 2 weeks starting on Jan 30th. Each quiz will consist of multiple choice, T/F, and other simple exercises based on lecture materials.

Assignments and final project

The following assignments will be due every 2 weeks, starting on Feb 6th:

- 1) Review of 3 broad topics within the Planetary Science Decadal Survey.
- 2) Review of 3 broad topics within more focused science goal documents.
- 3) Review of 3 broad topics within scientific literature.
- 4) Team data analysis review and mini proposal.
- 5) Team instrument review and mini proposal.
- 6) Team mission review and mini proposal.
- 7) Team final project presentation.
- 8) Team final project writeup.

Examinations:

- Each student will take a written exam, tentatively scheduled for March 24th during the normal class time (12:30 to 13:45). This exam may include any material covered in class up to the examination date.
- [TBD] An optional makeup oral exam can be scheduled at each student's request in April. This exam will cover the same materials as the written exam. It will consist of randomly chosen questions and simple exercises and may have a duration of 30-40 min. The exam will be scheduled outside of normal class time and at least 2 students must be present in addition to the examinee.

Grading scale and policies:

- Exams, quizzes, and final presentations must be completed during the times specified by the instructor.
- Assignments that are turned in <24 h past the due date/time will receive a maximum of 50% credit.
- Lab assignments turned in ≥ 24 h past the due date/time will receive no credit.
- Exceptions to the above policies should be requested at least 3 days before the due dates of the exams/quizzes/assignments or should be accompanied by a note from a medical professional.
- Below are the scores that will be given for each component of the class:
 - Participation: 5 points
 - Quizzes: 10 points
 - Exam: 20 points
 - Assignments 1-6: 5 points each (30 points total)
 - Assignment 7 (project presentation): 10 points
 - Assignment 8 (project written proposal): 30 points
- The final grade will be calculated as a percentage out of a total of 100 points: A $\geq 90\%$, B $\geq 80\%$, C $\geq 70\%$, D $\geq 60\%$, F <60%.

Classroom attendance:

Health guidelines:

- 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.
- Campus Health (<http://www.health.arizona.edu/>) provides quality medical and mental health care services through virtual and in-person care.
- Counseling and Psych Services (CAPS, <https://health.arizona.edu/counseling-psych-services>) provides mental health care, including short-term counseling services.

Absence policies:

- Notify your instructor if you will be missing a course meeting or an assignment deadline.
- Absences for any sincerely held religious belief, observance, or practice will be accommodated where reasonable. Refer to the [UA Religious Accommodation Policy](#).
- Absences pre-approved by the University Dean of Students (or dean's designee) will be honored.
- 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.

Feedback:

Your feedback on this course is most welcome and will help everyone. Feel free to reach out to the instructor or other UA/LPL personnel to express concerns or comment on your learning experience. You can also find an anonymous feedback form here: <https://forms.gle/rTYwDaRm5Npic6gJ9>

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.

Some learning styles are best served by using personal electronics, such as laptops and iPads. These devices can be distracting to other learners. Therefore, students who prefer to use electronic devices for note-taking during lecture should use one side of the classroom.

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>.

Code of 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: <http://deanofstudents.arizona.edu/academic-integrity/students/academic-integrity>.

The University Libraries have some excellent tips for avoiding plagiarism available at: <http://www.library.arizona.edu/help/tutorials/plagiarism/index.html>.

Selling class notes and/or other course materials to other students or to a third party for resale is not permitted without the instructor's express written consent. Violations to this and other course rules are subject to the Code of Academic Integrity and may result in course sanctions. Additionally, students who use D2L or UA email to sell or buy these copyrighted materials are subject to Code of Conduct Violations for misuse of student email addresses. This conduct may also constitute copyright infringement.

UA Nondiscrimination and Anti-harassment Policy:

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

Our classroom is a place where everyone is encouraged to express well-formed opinions and their reasons for those opinions. We also want to create a tolerant and open environment where such opinions can be expressed without resorting to bullying or discrimination of others.

Accessibility and 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 let me know immediately so that we can discuss options. You are also welcome to contact Disability Resources (520-621-3268) to establish reasonable accommodations. For additional information on Disability Resources and reasonable accommodations, please visit <http://drc.arizona.edu/>.

If you have reasonable accommodations, please plan to meet with me by appointment or during office hours to discuss accommodations and how my course requirements and activities may impact your ability to fully participate.

Please be aware that the accessible table and chairs in this room should remain available for students who find that standard classroom seating is not usable.

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.

Additional Resources for Students:

UA Academic policies and procedures are available at:

<http://catalog.arizona.edu/2015-16/policies/aaindex.html>

Student Assistance and Advocacy information is available at:

<http://deanofstudents.arizona.edu/student-assistance/students/student-assistance>

Survivor Advocacy Program

<https://survivoradvocacy.arizona.edu/>

The Survivor Advocacy Program provides confidential support and advocacy services to student survivors of sexual and gender-based violence. The Program can also advise students about relevant non-UA resources available within the local community for support.

Email: survivoradvocacy@email.arizona.edu

Phone: 520-621-5767

Campus Pantry:

Any student who has difficulty affording groceries or accessing sufficient food to eat every day, or who lacks a safe and stable place to live and believes this may affect their performance in the course, is urged to contact the Dean of Students for support. In addition, the University of Arizona Campus Pantry is open for students to receive supplemental groceries at no cost. Please see their website at: campuspantry.arizona.edu for open times. Furthermore, please notify me if you are comfortable in doing so. This will enable me to provide any resources that I may possess.

Preferred Gender Pronoun:

This course affirms people of all gender expressions and gender identities. If you prefer to be called a different name than what is on the class roster, please let us know. Feel free to correct instructors on your preferred gender pronoun. If you have any questions or concerns, please do not hesitate to contact us directly in class or via email (instructor email). If you wish to change your preferred name or pronoun in the UAccess system, please use the following guidelines:

- **Preferred name:** University of Arizona students may choose to identify themselves within the University community using a preferred first name that differs from their official/legal name. A student's preferred name will appear instead of the person's official/legal first name in select University-related systems and documents, provided that the name is not being used for the purpose of misrepresentation. Students are able to update their preferred names in UAccess.
- **Pronouns:** Students may designate pronouns they use to identify themselves. Instructors and staff are encouraged to use pronouns for people that they use for themselves as a sign of respect and inclusion.

Students are able to update and edit their pronouns in UAccess.

More information on updating your preferred name and pronouns is available on the Office of the Registrar site at <https://www.registrar.arizona.edu/>.

Confidentiality of Student Records:

<http://www.registrar.arizona.edu/ferpa/default.htm>

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

Subject to Change Statement:

Information contained in the course syllabus, other than the grade and absence policy, may be subject to change with reasonable advance notice, as deemed appropriate by the instructor.