

SYLLABUS FOR PTYS/GEOS/HWRS 411

Geology and Geophysics of the Solar System (3 Credits)

Kuiper Space Sciences Building, Room 312, Tuesdays and Thursdays from 11:00 pm to 12:15 pm

Description of Course

This class will explore a variety of geologic processes and how they have shaped planetary landscapes and environments. To achieve this goal, students to develop a quantitative understanding of the major geophysical and geochemical processes associated with planetary bodies in our Solar System. Students will be also expected to develop their scientific reasoning and writing skills by conducting independent literature reviews and synthesizing their findings into an original research report.

Course Prerequisites or Co-requisites

There are no explicit course prerequisites and anyone may enroll; however, the course is intended for juniors and seniors and as such contains advanced material. Many of the lectures and homework assignments will contain material of a mathematical nature and at least a basic knowledge of calculus will be necessary to understand it. Students will also be expected to conduct weekly readings and develop written assignments. Please speak to the instructor if you have any questions or concerns.

Instructor and Contact Information

Christopher Hamilton, Phone: +1-301-305-3818, e-mail address: chamilton@arizona.edu

Office Hours: Due to risks posed by covid-19, all meetings with students outside of lectures must be arranged remotely (via Zoom) to help ensure a safe and healthy working environment.

All course materials, assignments, and correspondence will be disseminated through the University of Arizona's D2L system: <https://d2l.arizona.edu/>

Course Format and Teaching Methods

The format of the course will include: in-class lectures and group assignments; weekly reading assignments drawn from both the course textbook and external material; a mid-term; and a final research report accompanied by an in-class presentation.

Course Objectives

Each week, students will read one chapter from the course textbook and read one additional peer-reviewed scientific paper. This information will then be synthesized into a term project, consisting of a written report and final presentation. Students are expected to attend lectures and complete homework assignments on time. Together these activities are intended to provide students with a fundamental understanding of geological and geophysical processes and develop skills related to critical thinking.

Expected Learning Outcomes

Each week, students will read one chapter from the course textbook and read one additional peer-reviewed scientific paper. This information will then be synthesized into a term project, consisting of a written report and final presentation. Students are expected to attend lectures and complete homework

assignments on time. Together these activities are intended to provide students with a fundamental understanding of geological and geophysical processes and develop skills related to critical thinking.

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>

Participating in the course and attending lectures and other course events are vital to the learning process. As such, attendance is required at all lectures and discussion section meetings. Absences may affect a student's final course grade. If you anticipate being absent, are unexpectedly absent, or are unable to participate in class online activities, please contact me as soon as possible. To request a disability-related accommodation to this attendance policy, please contact the Disability Resource Center at (520) 621-3268 or drc-info@email.arizona.edu. If you are experiencing unexpected barriers to your success in your courses, the Dean of Students Office is a central support resource for all students and may be helpful. The Dean of Students Office is located in the Robert L. Nugent Building, room 100, or call 520-621-7057.

Makeup Policy for Students Who Register Late

Students who register after the first-class meeting may make up missed assignments and the deadline for by Thursday, February 3rd, 2022. After this time late assignments will not be accepted.

Course Communications

Course communication will be conducted via D2L to and from official university of Arizona e-mail addresses.

Required Texts or Readings

The course will use the following textbook:

Melosh, H. J. (2011) "Planetary Surface Processes", Cambridge University Press, New York, 500 pp.

This book is available through the University of Arizona bookstore as well as through The University of Arizona Libraries in both hardcopy and electronic formats. PDF copies of the required reading for the first two-weeks of class are available through the course website on D2L, but after the first two-weeks students will be responsible for obtaining the reading material themselves.

Required or Special Materials

No special tools are required for this class; however, it is assumed that students have access to a basic computer, software (e.g., Microsoft Office, which is freely available through The University of Arizona), and internet connectivity to access electronic documents (e.g., the eBook textbook), prepare and submit assignments, and access other on-line content via D2L.

Required Extracurricular Activities

Depending on scheduling availability, the instructor will arrange for the class to spend one class in the planetarium for a special presentation.

Assignments and Examinations: Schedule/Due Dates

Weekly reading assignments include a chapter from the course (text book) and a peer-review scientific paper of the student's choosing. Reading summaries of the scientific paper are due via D2L before class each Thursday beginning January 20. However, no reading reports are due during spring break or during the week of the mid-term exam. The final term paper will be due on April 14. Final presentations will be scheduled between April 19 and 28 and are expected to be approximately ten-minutes-long. If students wish to obtain feedback on their term paper prior to grading, they may submit it to the instructor at least one-week before the due date (i.e., April 7). The mid-term will be held in-class on March 31, and a mid-term review session will be held in-class on March 29. For full details see Table 1 in the "Scheduled Topics/Activities" section of the syllabus.

Final Examination or Project

This course will include a final report in lieu of a final examination.

Grading Scale and Policies

The course will employ The University of Arizona's standard grade system (i.e., A, B, C, D, and E). For additional information regarding the university's policy regarding grades and grading systems see: <http://catalog.arizona.edu/policy/grades-and-grading-system>

Homework Assignments: $10 \times 3\% = 30\%$

Term Project: $1 \times 30\% = 30\%$

Term Project Oral Presentation: $1 \times 10\% = 10\%$

In-Class Exam: $1 \times 30\% = 30\%$

All final grades will be rounded up to the nearest whole percentage point and percentage grades will be converted to letter grades as follows:

| | | |
|--------------------|---|---|
| $\geq 90\%$ | → | A |
| $\geq 75\%$ (<90%) | → | B |
| $\geq 60\%$ (<75%) | → | C |
| $\geq 50\%$ (<60%) | → | D |
| <50% | → | E |

Incomplete (I) or Withdrawal (W):

Requests for incomplete (I) or withdrawal (W) must be made in accordance with University policies, which are available at <http://catalog.arizona.edu/policy/grades-and-grading-system#incomplete> and <http://catalog.arizona.edu/policy/grades-and-grading-system#Withdrawal> respectively.

Dispute of Grade Policy

If an error has been made with a grade, please address the issue with the instructor within one week of the grade being posted on D2L. At the end of the semester, final grades will be rounded up to the nearest percentage point. However, grades will not otherwise be scaled or modified, so please do not request an

arbitrary inflation of your grade at the end of the semester. The answer will be, “no”. That said, mistakes do happen and it is reasonable and appropriate to challenge a mistake on an exam or assignment, but please do so in a timely fashion, not at the end of the semester.

Honors Credit

To take this course for Honors credit, students should contact the instructor to develop an Honors contract. Honors contract information is available at <https://www.honors.arizona.edu/honors-contracts>.

Scheduled Topics/Activities

Table 1 summarizes the topics and baseline reading assignments for the semester. Additional reading assignments may be added (see notices on D2L). It is expected that students will read designated chapters by Tuesday of each week to be informed about the topics presented during the week’s lectures. Assignments (due on Thursdays) must be uploaded before class via D2L. Upload folders will be closed once class starts and late assignments will only be accepted with the instructor’s consent. Unless prior arrangements, late assignments—if they are accepted at all—will receive a 20% penalty each day the assignment is late, including the first day they are due. Instructions for the weekly assignments and term paper are available on D2L, and will be reviewed in class.

Table 1. Spring 2022 Schedule for PTYS/GEOS/HWRS 411

| Week | Tuesday | Thursday |
|-------------|--|---|
| 1 | – | Jan. 13: Syllabus Review |
| 2 | Jan. 18: Introduction to the Solar System <i>Reading: “Planetary Surface Processes”, Chapter 1: The Grand Tour</i> | Jan. 20: Introduction to the Solar System <i>Homework 1 Due: Paper Review</i> |
| 3 | Jan. 25: The Fundamental Properties of Geologic Materials <i>Reading: “Planetary Surface Processes”, Chapter 3: Strength vs. Gravity</i> | Jan. 27: The Fundamental Properties of Geologic Materials <i>Homework 2 Due: Paper Review</i> |
| 4 | Feb. 1: Tectonic Processes <i>Reading: “Planetary Surface Processes”, Chapter 4: Tectonics</i> | Feb. 3: Tectonic Processes <i>Homework 3 Due: Paper Review</i> |
| 5 | Feb. 8: Aeolian Processes <i>Reading: “Planetary Surface Processes”, Chapter 9: Wind</i> | Feb. 10: Aeolian Processes <i>Homework 4 Due: Paper Review</i> |
| 6 | Feb. 15: Volcanic Processes <i>Reading: “Planetary Surface Processes”, Chapter 5: Volcanism</i> | Feb. 17: Volcanic Processes <i>Homework 5 Due: Paper Review</i> |

| | | |
|----|--|---|
| 7 | Feb. 22: Impact Cratering Processes <i>Reading: "Planetary Surface Processes", Chapter 6: Impact Cratering</i> | Feb. 24: Impact Cratering Processes <i>Homework 6 Due: Paper Review</i> |
| 8 | Mar. 1: Weathering and Erosion <i>Reading: "Planetary Surface Processes", Chapter 17: Regoliths, Weathering, and Surface Texture</i> | Mar. 3: Weathering and Erosion <i>Homework 7 Due: Paper Review</i> |
| 9 | Mar. 8: No Class (Spring Break) | Mar. 10: No Class (Spring Break) |
| 10 | Mar. 15: Planetary Ices <i>Reading: "Planetary Surface Processes", Chapter 11: Ice</i> | Mar. 17: Planetary Ices <i>Homework 8 Due: Paper Review</i> |
| 11 | Mar. 22: Deep-Time and Astrobiology <i>Reading: Selections will be posted on D2L</i> | Mar. 24: Deep-Time and Astrobiology <i>Homework 9 Due: Paper Review</i> |
| 12 | Mar. 29: Mid-Term Review | Mar. 31: Mid-Term Examination |
| 13 | Apr. 5: Solar System: Inner Solar System <i>Reading: Selections will be posted on D2L</i> | Apr. 7: Inner Solar System <i>Homework 10 Due: Paper Review</i> |
| 14 | Apr. 12: Outer Solar System <i>Reading: Selections will be posted on D2L</i> | Apr. 14: Outer Solar System <i>Term Paper Due</i> |
| 15 | Apr. 19: Term Project Presentations | Apr. 21: Term Project Presentations |
| 16 | Apr. 26: Term Project Presentations | Apr. 28: Term Project Presentations |
| 17 | May. 3: Exoplanets <i>Graded Term Papers returned to students</i> | – |

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, making phone calls, web surfing, knitting, 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. However, these devices can be distracting to other learners. Students who prefer to use electronic devices for note-taking during lecture may do so, but please use your devices responsibly.

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>.

Notification of Objectionable Materials

This course does not contain material of a mature nature, such as explicit language, depictions of nudity, sexual situations, and/or violence. However, students are encouraged to speak with the instructor to voice concerns and to provide feedback should there be any issues.

Accessibility and Accommodations

At the University of Arizona, we strive to make learning experiences as accessible as possible. If you anticipate or experience barriers based on disability or pregnancy, please contact the Disability Resource Center (520-621-3268, <https://drc.arizona.edu/>) to establish reasonable accommodations.

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://new.library.arizona.edu/research/citing/plagiarism>.

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 e-mail to sell or buy these copyrighted materials are subject to Code of Conduct Violations for misuse of student e-mail addresses. This conduct may also constitute copyright infringement.

Nondiscrimination and Anti-harassment Policy

The University of Arizona is committed to creating and maintaining an environment free of discrimination. In support of this commitment, the University prohibits discrimination, including harassment and retaliation, based on a protected classification, including race, color, religion, sex, national origin, age, disability, veteran status, sexual orientation, gender identity, or genetic information. For more information, including how to report a concern, please see <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.

Additional Resources for Students

UA Academic policies and procedures are available at <http://catalog.arizona.edu/policies>

Campus Health

<http://www.health.arizona.edu/>

Campus Health provides quality medical and mental health care services through virtual and in-person care.

Phone: 520-621-9202

Counseling and Psych Services (CAPS)

<https://health.arizona.edu/counseling-psych-services>

CAPS provides mental health care, including short-term counseling services.

Phone: 520-621-3334

The Dean of Students Office's Student Assistance Program

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

Student Assistance helps students manage crises, life traumas, and other barriers that impede success.

The staff addresses the needs of students who experience issues related to social adjustment, academic challenges, psychological health, physical health, victimization, and relationship issues, through a variety of interventions, referrals, and follow up services.

Email: DOS-deanofstudents@email.arizona.edu

Phone: 520-621-7057

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

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 me know. Feel free to correct instructors on your preferred gender pronoun. If you have any questions or concerns, please do not hesitate to contact me 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/>

Safety on Campus and in the Classroom

Familiarize yourself with the University of Arizona's Evacuation and Active Shooter plans specific to the Kuiper Space Sciences Building. See: <https://cals.arizona.edu/>

Also watch the video available at <https://ua-saem-aiss.narrasys.com/#/story/university-of-arizona-cert/active-shooter>

Confidentiality of Student Records

Please see:

<http://www.registrar.arizona.edu/personal-information/family-educational-rights-and-privacy-act-1974-ferpa?topic=ferpa>

Covid-19 and other Life Challenges

- **Statement on compliance with COVID-19 mitigation guidelines:**
 - As we enter the Spring semester, the health and wellbeing of everyone in this class is the highest priority. Accordingly, we are all required to follow the university guidelines on COVID-19 mitigation. Please visit www.covid19.arizona.edu for the latest guidance.

- **Classroom attendance:**
 - If you feel sick, or if you need to isolate or quarantine based on [University protocols](#), stay home. Except for seeking medical care, avoid contact with others and do not travel.
 - Notify your instructor(s) 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, please contact the Dean of Students Office DOS-deanofstudents@email.arizona.edu to share documentation about the challenges you are facing.
 - Voluntary, free, and convenient [COVID-19 testing](#) is available for students on Main Campus.
 - If you test positive for COVID-19 and you are participating in on-campus activities, you must report your results to Campus Health. To learn more about the process for reporting a positive test, visit the [Case Notification Protocol](#).
 - The COVID-19 vaccine and booster is available for all students at [Campus Health](#).
 - Visit the [UArizona COVID-19](#) page for the most up-to-date information.

- **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.

- **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.

Subject to Change Statement

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.