

Course Instructor and Contact Information

Lead Instructor: Kate Hendrickson
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Office: Wright Labs, Busch Campus, Room 105
Office Hours: Tuesdays after class, or by appointment

Co-instructor: Shaunna Morrison
Email: s.morrison@rutgers.edu
Office: Wright Labs, Busch Campus, Room 115
Office Hours: By appointment

Course Meeting Days, Times, Location, Modality

Tuesdays and Fridays
10:20am – 11:40am
SEC – 117
In-person

Assignments and Homework will be accessible on Canvas LMS:

- <https://rutgers.instructure.com/courses/406609>

Should a course be moved to online synchronous due to weather, instructor illness, etc., class will be held at the usual time at the following zoom link:

- <https://rutgers.zoom.us/j/94670474306>
- Meeting ID: 946 7047 4306
- Password: Planet Mars (but with no space)

Course Overview

Description: This course is an introduction to the geology of the planet Mars. Topics include the history of Mars, scientific frontiers related to martian research, and the impact of technological advances on our understanding of the planet.

⇒ **Prerequisites:** None. Designed for non-science majors and minors; partially fulfills SAS Natural Sciences (NS) and Our Common Future (CCO) core requirements.

Learning Goals: Students will learn the key concepts needed to integrate the current exploration of planet Mars into their understanding of the scientific discovery on the Earth and beyond. Students will:

- a. Understand and apply basic principles and concepts in planetary science.

- b. Explain and recognize the development of historic ideas about, and modern interpretations of, remote sensing and sample studies of the Planet Mars.
- c. Understand the methods, evidence, hypotheses, and theory of the evolution of Mars that result from ~50 years of scientific exploration of the most earthlike planet that will be developed
- d. Identify and critically assess societal issues in the pursuit of technologically challenging scientific exploration.
- e. Meet the [EPS Department Learning Goals](#).

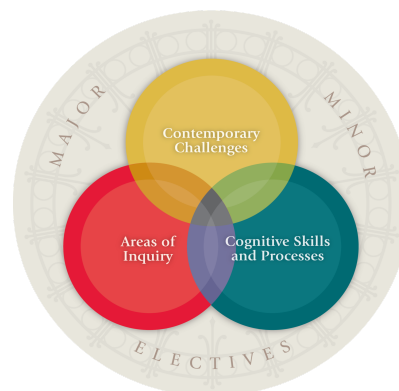
This course satisfies [SAS Core Curriculum Goals](#):

I: Areas of Inquiry (Natural Sciences)

- Understand and apply basic principles and concepts in the physical or biological sciences.
- Explain and be able to assess the relationship among assumptions, method, evidence, arguments, and theory in scientific analysis.

II: 21st Century Challenges (Contemporary Challenges)

- Analyze a contemporary global issue from a multi-disciplinary perspective.
- Analyze the relationship that science and technology have to a contemporary social issue.



Required Texts and Course Materials

There is no required textbook for this course.

Our understanding of Mars is ever-changing, so to keep our class-content as modern as possible, pre-class readings will largely consist of (portions of) peer-reviewed publications and other articles made available on canvas.

Should you desire a textbook for your personal study, I recommend the following.

- *The Surface of Mars* by Michael Carr. Cambridge Planetary Science. ([link](#))
- *Mars: An Introduction to its Interior, Surface and Atmosphere* by Nadine Barlow. Cambridge Planetary Science. ([link](#))

Technical / Technology Requirements

Students are expected to bring an electronic device to class capable of accessing the internet and Canvas for in-class quizzes and activities. A personal laptop is recommended, but a smartphone or tablet can be used if you can comfortably complete canvas quizzes on it. It is the student's responsibility to ensure their personal device is charged and capable of completing these quizzes and activities.

- If you do not have the appropriate technology for financial reasons, please email the Dean of Students at deanofstudents@echo.rutgers.edu for assistance. If you are facing other financial hardships, please visit the [Office of Financial Aid](#).

- You can get support for your course's in-room technology in general purpose classrooms from [Digital Classroom Services](#).
- If you cannot complete assignments on a personal device, please consider utilizing campus computer labs or libraries.
- You can choose to visit [Rutgers Student Tech Guide](#) website for resources.

Grading Scale

A=90–100; B+=85–89.9; B=80–84.9; C+=75–79.9; C=70–74.9; D=60–69.9; F=<60

The GPA equivalent of these grades is.

A=4; B+=3.5; B=3; C+=2.5; C=2; D=1; F=0

- For Warning Grade information, add/drop deadlines, and other semester dates, please see the [Fall 2026 Academic Calendar](#).

Assessment / Grading Components

Weighting of Assessments

Class Participation - 5%

Open-Book Reading Quizzes - 20%

In-Class Exit Questions - 10%

Assignments - 25%

Exams - 30%

Final Project - 10%

Class Participation (5%): It is expected that you come to class ready to engage in class activities, be respectful of your instructors and peers, and contribute to a positive learning community. Participation will include thoughtful attention while others are speaking, discussions, polls, and other activities. You do not need to speak up during class to participate: asking questions during lecture is encouraged but not required or tracked. Consistent absence, lack of engagement, or disrespectful behavior toward your peers detracts from your participation grade.

Open-Book Reading Quizzes (20%): Before coming to each class, you will need to complete a brief (~5 to 10 question) quiz on Canvas related to the assigned reading(s) relating to the upcoming (or occasionally previous) class material. Quizzes on pre-class reading material are intended to help you come to class with sufficient context to succeed. Repetition of foundational knowledge is a core part of learning, and ideally you will be exposed to core concepts multiple times through reading, quizzes, in-class lectures/activities, and exit questions. Additionally, having foundational knowledge will enable us to focus on exploring concepts more deeply or hands-on during class. These quizzes are open-book and untimed so you can complete them in your preferred manner: after you read, while you read, or even in multiple sittings if you exit the browser and come back later (provided you submit before it closes, but do not submit the quiz until it is complete as you only receive one attempt). Open-book does not allow asking LLMs (e.g. ChatGPT), your classmates, or the internet for answers to specific questions. AI or your

classmates may help you understand the reading, but you should not use classmates or AI to generate, select, or verify answers to the quiz itself. To minimize stress around low scores and account for illness, emergencies, technical difficulties, etc., your lowest three quizzes will be automatically dropped; you do not need to request permission for these drops.

In-Class Exit Questions (10%): To help reinforce core concepts, there will be brief exit questions at the end of each class, administered on Canvas as a quiz. These exit questions will be on the most important takeaways from the lecture or activity in class that day. Unlike the reading quizzes, these will be timed as they are due at the end of class. You must be in-class in order to receive the password and take the quiz, which will be given 5 to 10 minutes before the end of class. Do not share the password with students who are not in class. These questions will be open-note should you need them, but should be straightforward if you did your best to pay attention in class that day. If you finish with a few minutes to spare, please pack up and/or exit respectfully as other students in your row may still be completing the exit questions. To account for illness or other extenuating circumstances preventing you from attending class, your lowest four exit questions will be automatically dropped; you do not need to request permission for these drops. Students with accommodations affecting their ability to complete the Exit Questions as described should reach out to the instructor for an alternate method. (If you experience a technology problem during an in-class assessment, you must notify the instructor before leaving class. Widespread internet or Canvas outages will result in cancellation of the quiz.)

Assignments (25%): Approximately every two to three weeks (~5 assignments), you will have an assignment due. These assignments are meant to be applications of what we discussed in class. Frequently using software, data, and problem solving directly relevant to Mars and modern science. These assignments may be started in-class, but are expected to require a few hours outside of class.

Exams (30%): There will be two exams, each weighted 15% of your grade. These exams will be completed on paper in-class, and will be a mix of multiple choice and free-response. Reviewing reading quizzes and exit questions as part of your studying is an excellent way to prepare for the exams. Not all of the test questions will be multiple choice, or directly from these quizzes so do not make this your only method of study. Reviewing concepts from lectures and assignments is also essential. Some information from Exam 1 may be relevant to Exam 2, but the two exams are meant to be stand-alone, not cumulative, with Exam 2 focusing on content from the second half of class.

Final Project (10%): As a final project, you will conceptually design a scientific mission to Mars and submit a “mission proposal.” You will be expected to (1) come up with a scientifically compelling question, (2) form a hypothesis, (3) determine what instruments would be necessary on your mission to come up with an answer, (4) select where on Mars you could investigate this question (either a landing site or region of interest if studied from orbit), and (5) decide what experiments or data your mission would collect. This project should be the culmination of your understanding of how and why we study Mars, what challenges we have to overcome, and the

scientific method. Details on this project will be given later in the semester. This will be due on Canvas at the end of our scheduled final exam period, **11:00am 12/18/26**. There is no in-person requirement for submission.

Schedule of Topics

Below is an initial schedule for the course. As there may be some adjustments, the most recent schedule will be accessible at [this google sheet](#). Additionally, assignment due dates and topics posted on Canvas serve as the final authority for the course schedule.

Class	Day	Date	Topic	Martian Spacecraft Examined
1	Tues	9/1	Formation of the Solar System	
2	Fri	9/4	The Periodic Table and Ionic Bonding	
<i>Skip</i>	<i>Tues</i>	<i>9/8</i>	<i>NO CLASS, MONDAY SCHEDULE</i>	
3	Fri	9/11	Minerals, Rocks, and the Rock Cycle	
4	Tues	9/15	Geologic Time	
5	Fri	9/18	Meteorites	
6	Tues	9/22	Volcanism and Interior Layers	The Mariner Missions (1964 – 1971)
7	Fri	9/25	Surface Conditions	The Viking Missions (1976)
8	Tues	9/29	Aeolian Processes: Dust and Dunes	
9	Fri	10/2	Surface Water: Part 1	Mars Global Surveyor (1997 – 2006)
10	Tues	10/6	Surface Water: Part 2	Pathfinder (1997)
11	Fri	10/9	Groundwater: Hydrothermal and Acidic	Spirit and Opportunity (2003 – 2018)
12	Tues	10/13	Ice	Mars Express (2003 – present), Phoenix (2007 – 2008)
13	Fri	10/16	Mars vs. Earth	
14	Tues	10/20	Review	
15	Fri	10/23	EXAM 1	
16	Tues	10/27	Mineralogy and Chemistry: Orbital	Mars Reconnaissance Orbiter (2005 – present), Mars Odyssey (2001 – present)
17	Fri	10/30	Mineralogy and Chemistry: Surface	Curiosity (2011 – present)
18	Tues	11/3	Radiation, Atmosphere, and Climate	Mars Orbiter Mission (2013 – 2022)
19	Fri	11/6	Geophysics	MAVEN (2013 – 2025)
20	Tues	11/10	Seismology	Insight (2018 – 2022)
21	Fri	11/13	Controversial Ideas: An Ocean? An Impact Moon?	Tianwen-1 Zhurong (2021 – present), Hope Orbiter (2021 – present)
22	Tues	11/17	Habitability	Perseverance (2021 – present), ExoMars Trace Gas Orbiter (2016 – present)

23	Fri	11/20	Astrobiology	
24	Tues	11/24	Space Exploration and the Moon	The Artemis Program (current)
25	Wed	11/25	Modern Mars Problems	
26	Tues	12/1	Mission Proposals and Science Funding	Rosalind Franklin Rover (~2030)
27	Fri	12/4	Review	
28	Tues	12/8	EXAM 2	
			READING DAYS: 12/11-12/14	
			FINALS WEEK: 12/15-12/22	
	Fri	12/18	Final Paper Due by 11:00am (asynch)	

Policies

Communication

Please check your Rutgers email or Canvas notifications regularly for course related updates. All important information will be released as a Canvas announcement, so I recommend turning the notifications on to receive announcements as they are made.

Logistical questions should be directed to the Head Instructor (Hendrickson), through content related questions may be directed to either instructor.

I (Hendrickson) will do my best to respond to emails within two business days, but I have a very busy inbox. In the title of your email, please start with “PLANET MARS: _____” to ensure I flag your email as high priority and I will be more likely to respond in this timeframe. Please do not leave things to the last minute in case I do not see your email.

Late Work

Assignments are expected to be turned in before the deadline. It is the student’s responsibility to keep up with deadlines and stay on top of your assignments. If you need extra time, please reach out to the Lead Instructor (kate.hendrickson@rutgers.edu). Extensions may be granted for illness, emergencies, or other extenuating circumstances. When an extension is granted, no late penalty will normally be applied.

To keep on top of your grade, please follow this routine: Before class, do your reading and take the quiz. In-class, be ready for the exit questions and listen for if there is a homework assignment. After class, schedule time for you to complete the homework assignment (if applicable) and then follow through on completing that homework assignment.

Attendance and Participation

Attendance is included in your participation grade, described above. You are expected to attend class regularly. It is highly unlikely you will be able to succeed on exams and assignments without regular class attendance.

However, **do not attend class if you are sick**. This puts those around you, especially immunocompromised individuals, at risk. As stated above, four exit questions (the equivalent to 2 weeks of attendance) will be automatically dropped to account for illnesses. Should you have additional extenuating circumstances or are sick for more than a total of two weeks, please contact the lead instructor (kate.hendrickson@rutgers.edu) to work out an agreement regarding your attendance.

- You are encouraged to report your absences using [the University self-reporting absence system](#).
- [University policy 10.2.7 Course Attendance](#) indicates that students should be excused without penalty for absences from class because of religious observance and allowed to make up work missed because of such absence. Examinations and special required out-of-class activities should generally not be scheduled on days when religiously observant students refrain from participating in secular activities. Students should provide timely notification to instructors about necessary absences for religious observances and are responsible for making up missed work/exams. [Absences for Religious Obligations](#).
- If you have prolonged health and/or financial issues that are impacting your academics and well-being over an extended period of time, contact the Dean of Students at deanofstudents@echo.rutgers.edu.

Plagiarism

Please reach out to your instructors or peers for help when you are stuck, but do not copy the work of your classmates. You are encouraged to discuss concepts and help each other, but do not share files, answers, calculations, or written responses for another student to submit. What you submit must represent your own work. Suspected plagiarism will result in a zero.

Course Changes

The instructors reserve the right to make reasonable adjustments to the course schedule, readings, assignments, and activities as needed. Any substantive changes will be communicated through Canvas.

Rutgers Statement on Disability Accommodations

“Rutgers University is committed to the creation of an inclusive and safe learning environment for all students, and welcomes students with disabilities into all the University's educational programs. The [Office of Disability Services](#) (ODS) is responsible for the determination of appropriate accommodations for students who encounter barriers due to disability. Once a student has completed the ODS process (registration, initial appointment, and submitted documentation) and reasonable accommodations are determined to be necessary and appropriate, a Letter of Accommodation (LOA) can be requested and will be sent to the student and instructor. This should be done as early in the semester as possible as accommodations are not retroactive, and a discussion should occur about how the accommodations will be implemented. More information can be found at www.ods.rutgers.edu. You can contact ODS at (848)445-6800 or via email at dsoffice@echo.rutgers.edu.”

Generative AI Use Policy

Generative AI (such as ChatGPT, Gemini, Claude) are tools relevant to society. As such, they are tools relevant to this class. In this class, there are acceptable and unacceptable uses of AI. Where permitted, you are encouraged to assess the reliability of generative AI responses. You are responsible for the accuracy of everything you submit (including citations or interpretations). Please use AI thoughtfully and reasonably, as developing critical thinking skills is an essential part of life. “But Instructor Hendrickson, we can use AI in the real world after college!” You’re right, but the purpose of school and the purpose of a job are different. It’s a fascinating conversation, and I’m happy to discuss these kinds of philosophical questions with you.

Unacceptable uses of AI include:

- **Asking for answers to Reading Quizzes or Exit Questions** (explicitly prohibited)
- Asking AI for conclusions when you are expected to provide the primary interpretation of data
- Asking it to complete an assignment for you
- Generating entire essay or free-response answers for you
- Copying AI as your own work
- Probably times you think to yourself “this might be an unacceptable use of AI in a course.” (To those with a guilty conscience: when in doubt, ask!)

Acceptable Uses of AI might include:

- A “co-pilot” on tasks
- Asking it to quiz you on class material
- Chatting with AI about keypoints from readings after you have completed them
- Asking about something beyond the readings or class material you were curious about
- Generating instructions on **how to use a software** or find the right button
- Using AI to brainstorm ideas
- Having it re-explain something to you from class
- Giving you feedback and edits on your writing (for example, I used AI to help me phrase some things more clearly in this syllabus!)
- Making suggestions that you then synthesize into your work
- Identifying areas for further investigation
- Trying to critically determine what AI gets wrong or oversimplifies

Rutgers Academic Integrity Policy.

“Rutgers University takes academic dishonesty very seriously. By enrolling in this course, you assume responsibility for familiarizing yourself with the [Academic Integrity Policy](#) and the possible penalties (including suspension and expulsion) for violating the policy. As per the policy, all suspected violations will be reported to the Office of Student Conduct. Academic dishonesty includes (but is not limited to):

- Cheating
- Plagiarism
- Aiding others in committing a violation or allowing others to use your work
- Failure to cite sources correctly

- Fabrication
- Using another person's ideas or words without attribution, including re-using a previous assignment
- Unauthorized collaboration
- Sabotaging another student's work

If you are ever in doubt, consult your instructor."

Student Support and Resources

A list of Rutgers resources to support students in their academic success and mental wellness.

- [Student Success Essentials](#)
- [Student Support Services](#)
- [The Learning Centers](#)
- [Rutgers Libraries](#)
- [Bias Incident Reporting](#)
- [Dean of Students – Student Support Office](#)
- [Office of Veteran and Military Programs and Services](#)
- [Student Health Services](#)
- [Counseling, Alcohol and Other Drug Assistance Program & Psychiatric Services \(CAPS\)](#)
- [UWill](#): free immediate access to teletherapy; you can choose a therapist based on your preferences including issue, gender, language, ethnicity.
- [Office for Violence Prevention and Victim Assistance](#)
- [Office of Disability Services](#)
- [Basic Needs Assistance](#) (food, housing, and other essentials)
- [Rutgers Student Food Pantry](#)