

All About Mars

<https://midcoastseniorcollege.org/project/all-about-mars-course-website/>

Faculty:

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I use she/her pronouns.

I am an emeritus professor of Astronomy at Mount Holyoke College and am now employed by NASA as the Deputy Principal Investigator of the VERITAS mission to Venus, scheduled to launch in 2032. My interests began in field geology; I have worked extensively mapping the rocks in the Sebago region, and well as exploring and characterizing tourmaline mines throughout Maine. Over the years, I became interested in extraterrestrial samples, and have studied returned samples from the Moon, asteroids, and comets, as well as meteorites from the asteroid belt and from Mars. This led me adapt some of my techniques to orbital observations, like those we will undertake on Venus.

Wonderful Co-host:

Judy Fiterman

Course Description:

This course part of a series of classes about our solar system and what it teaches us about the past, present, and future of planet Earth. The course begins with a review of the history of Mars literature and exploration, then segues into discussion of the issues around its future, namely sending human explorers to Mars. A third week discusses what it's like to be part of a NASA mission like the Curiosity rover. Then we shift gears so cover Mars volcanos, craters, surface processes, and past environments on the planet as revealed by rover exploration over the past two decades.

Learning Goals:

This course supports the goals of the Midcoast Senior College by "support[ing] lifelong learning for seniors, emphasizing the liberal arts in an environment of community, conversation, and conviviality. In this class, we will have respectful discourse that will encourage you to think analytically and critically by questioning what you think you already know about space science, evaluating modern evidence, and articulating well-reasoned arguments around the interrelationships between science and politics. My personal emphasis is on empowering you not only with facts, but with the background resources you need to make critical evaluations of science as it is presented in modern media.

Reading materials: No books will need to be purchased – some light readings that are optional or publicly accessible will be placed on the website. The list will grow as the course proceeds.

Course expectations: Come with an open mind, and be prepared to ask questions at any time!

Duration of course: 6 weeks during the second fall session of 2025.

Schedule

November 3: We'll begin with introductions all around and then undertake a brief overview of Mars to provide context for the remainder of the class.

Concepts of the day:

How did Mars form, what is it made of, what is it like today?

How did volcanoes shape the surface of Mars?

What is the history of water on Mars?

How do we know the age of the Mars surface?

November 10: The early history of Mars exploration begins with the introduction of modern telescopes and the curious personality of Persival Lowell, a Boston-bred Brahmin who lit the imaginations of the 19th century with his speculations about canals and a lost civilization on Mars. Early 20th century science fiction presaged much of what was subsequently learned about Mars. Armed with this historical context, we'll move on to discuss the early history of Mars exploration. While the Apollo program was stealing the spotlight in the 1960's and 70's, exploration of Mars continued as part of the space race between the U.S. and the Soviet Union. Share in the excitement of the first images returned from the Red Planet, and the heartbreak of the Soviet attempts to beat the U.S. there. We'll ponder the relationship between politics and science that plagues our exploration of the Solar System.

Concepts of the day:

Ideas about water on Mars far pre-dated our modern discoveries.

The legacy of Persival Lowell.

The Soviet Union's Mars program versus that of the US

Reading and videos:

1960's Russia's secret landing on Mars: <https://www.youtube.com/watch?v=xltW2G60GCs>

[Viking 1](#)

[Viking 2](#)

Mars Global Surveyor

November 17: Darby will be away this week for a meeting of the Space Studies Board of the National Academies. In her place, the guest instructor will be her colleague at the Planetary Science Institute, Dr. Aileen Yingst. She has served on the science teams of all the modern Mars rovers: Mars Pathfinder, Mars Polar Lander, the Mars Exploration Rovers (*Spirit* and *Opportunity*), Mars Science Laboratory (*Curiosity*), and Mars 2020 (*Perseverance*). She will discuss the highs and lows that were part of the preparations for these Mars missions. We will journey with her to Kennedy Space Center for launches and then transition to the Jet Propulsion Laboratory in Pasadena for operations, continuing on to the present time wherein Aileen guides the rovers from her home in Brunswick. Then we'll discuss what it was like to live on "Mars time" and help guide the rover up a Mars mountain.

Concepts of the day:

I'm hoping you will gain an appreciation for the personal, human side of these missions!

Reading:

[Mars Pathfinder](#)

[Mars Exploration Rovers: Spirit and Opportunity](#)

[10 Amazing Mars Discoveries by Rovers Spirit & Opportunity](#)

[Mars Polar Lander](#)
[Opportunity Rover](#)
[Curiosity Rover](#)
[Perseverance Rover](#)

November 24: What does Mars have to teach us? This week we begin with an overview of volcanism on terrestrial objects (Earth, the Moon, Venus, Mars, Mercury, and asteroids) and what it can tell us about the interior structure of planets. How are magmas transported? What do their eruptive styles tell us about their compositions? How does volcanism on Mars reflect its evolution of over geologic time?

Concepts of the day:

Where does the heat that fuels planetary volcanism come from?

How are magmas transported?

What do their eruptive styles tell us about their compositions?

How does volcanism on Mars reflect its evolution of over geologic time?

December 1: The surface of Mars has changed a lot over its history. It is striking how much the processes that have shaped Mars are exactly the same as those on Earth. As part of this discussion, we'll look at the question of whether there once life on Mars? Here we'll trace the evolution of liquid and frozen water on the surface of Mars, and its implications for the history of life there. From subsurface ice to glaciers to ice caps to the atmosphere, water shapes the surface and has critical importance for human habitability of the Red Planet.

Concepts of the day:

What is the evidence for water on the surface of Mars?

What is the record of Martian climate change?

December 8: *The Martian*. On this day, the class will meet in the theater at the Highlands at the regular time, though this class will likely run long. We will watch the movie "The Martian" starring Matt Damon. After the showing, I'll call on you students to point out accuracies and inaccuracies in the movie based on the knowledge you've gleaned from the course. Others from the community will be invited to attend, so you can bring all the people you've been telling about this course. I hope this is a fun way to conclude our class!

Concepts of the day:

How well is science commonly represented in movies, television, and print media?

How can members of the public research whether the science is accurate?

How trusting can we be of the media?

What specific portrayals of science in *The Martian* are incorrect or misleading/ Why were they implements?