

EXPLORATIONS OF MARS

Graham School of Continuing Liberal and Professional Studies

Autumn 2022

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Meetings: Tuesday evenings on Zoom



COURSE DESCRIPTION

Everyone is talking about Mars. Is there life there? Will humans ever set foot on the surface? Should we try to establish a settlement? How did we become obsessed with the Red Planet in the first place? Whether you have no prior knowledge of Mars or are someone deeply fascinated with space exploration this course will prepare you to join and lead Mars conversations happening across society. Through non-technical readings, activities, and discussions focused on the history and culture of Mars exploration we will build an understanding of important figures, events, ideas, and trends. A major focus will be learning how Mars has factored into different social and political projects here on Earth, including theological debates, military conquest, scientific exploration, commercial settlement, and many others. The course moves from the earliest visual observations of Mars to recent robotic missions on the planet's surface, and also considers plans for future human exploration and habitation. Students with backgrounds in the humanities, social sciences, and physical sciences can all expect a deepened understanding of our important cosmic neighbor.

INCLUSIVITY AND ACCESSIBILITY

I take inclusivity and accessibility very seriously. This course must be inclusive and accessible to all who enroll in it. I expect all members of this course to contribute in ways that make this learning environment respectful, welcoming, and inclusive to all members of our group. If there are aspects of the instruction or course design that pose a barrier to access or inclusion, please let me know as soon as possible so I can take steps to remedy the situation. I also welcome anonymous feedback. I am committed to creating an accessible and intellectually fruitful learning environment for everybody.

COURSE COMPONENTS

This course consists of three key components:

- 1) **Readings:** Find all required reading(s) for each week on the schedule below. All readings will be provided to you in digital format. You do not need to purchase any books for this course.
- 2) **Activities:** In addition to a reading, there is also a short activity to complete each week before our meeting. Each activity is designed to complement the reading and deepen your relationship to Mars.
- 3) **Meetings:** We will meet weekly on Zoom for in-depth discussions of our readings and activities. These meetings may also include short lecture components as well as opportunities to share and discuss recent events or developments to do with Mars and space exploration.

Participation and Discussion

Preparation for participation in our weekly discussions is crucial for getting the greatest benefit from this course. I expect you to participate in the discussions having taken in the required selections, completed the activities, and reflected on both before coming to class, and to arrive at class with your own notes and thoughts. During our meetings I will expect you to contribute to discussions by raising questions, analyzing themes or episodes that stood out to you, or relating the course material to your own interests and real-world experiences.

WEEKLY SCHEDULE

WEEK 1: INTRODUCTION

This week provides the foundations for our explorations of Mars. It includes a brief overview of the history of Mars observation and exploration and an introduction to the basic physical properties of the planet.

Tuesday, September 27

Reading: W. Henry Lambright, *Why Mars? NASA and the Politics of Space Exploration* (Baltimore: Johns Hopkins University Press, 2014)

- a. Introduction, pp. 1-16.
- b. The Call of Mars, pp. 17-26.

Activity: Spend 15 minutes exploring NASA's Mars Exploration Program's website: <https://mars.nasa.gov/>

WEEK 2: HISTORY

We will examine how experts studied and publicly communicated about Mars in the nineteenth century.

Tuesday, October 4

Reading: Richard Proctor, “Mars, The Miniature of Our Earth” in *Other Worlds Than Ours: The Plurality of Worlds Studied Under the Light of Recent Scientific Researches*. (London: Longmans, Green, and Co., 1870) pp. 85-110.

Activity: Using online resources, learn how to find Mars in the night sky. Go outside and attempt to make a visual observation of the planet. Were you able to locate it? What does Mars make you think about?

WEEK 3: SCIENCE

What is it like to do science on Mars? A sociological perspective shows how NASA teams at the Jet Propulsion Laboratory (JPL) work to control remote rovers on the surface. Our focus will be on the JPL command structure and the power of images in determining how science gets done.

Tuesday, October 11

Reading: Janet Vertesi, *Seeing Like a Rover: How Robots, Teams, and Images Craft Knowledge of Mars* (Chicago: University of Chicago Press, 2015)

- a. Introduction: Seeing and Drawing Mars, pp. 1-24
- b. Chapter 1: Where Do Images Come From? Planning a Day on Mars, pp. 25-52.

Activity: Spend 20 minutes driving a virtual rover using NASA’s “Experience Curiosity” simulator.

LINK: <https://eyes.nasa.gov/curiosity/>

WEEK 4: MILITARIZATION

During the Cold War Mars became a potential site of military exploration and conflict. What are the hallmarks of military space science and how does it differ from modern civilian science on Mars?

Tuesday, October 18

Reading: Wernher Von Braun, *Mars Project: A Technical Tale* (Urbana: University of Illinois Press, 1953)

- a. Author's Preface, pp. 7-9.
- b. Chapter 1: Plans or Dreams? pp. 18-22 (just this section).
- c. Chapter 21: Down to Mars, pp. 159-163
- d. Chapter 22: A Grayish Mass, pp. 164-169
- e. Chapter 23: Contact, pp. 170-176.
- f. Chapter 24: How Mars is Governed, pp. 177-179

Activity: Read science journalist Sarah Scoles's article in the New York Times "The Doctor from Nazi Germany and the Search for Life on Mars" (July 2020)

LINK: <https://www.nytimes.com/2020/07/24/science/mars-jars-strughold.html>

WEEK 5: LIFE?

The question of whether life exists on Mars is centuries old. This week's readings reveal how the debate was framed in the early 20th century. Our discussion will take us from the past up to the present and into future of the scientific search for life in the universe.

Tuesday, October 25

Readings: The Lowell-Wallace Debate.

- a. Percival Lowell, "Conclusion" in *Mars and Its Canals* (New York: Macmillan, 1906), pp. 376-384.
- b. Alfred Russell Wallace, "Summary and Conclusion" in *Is Mars habitable? A critical examination of Professor Percival Lowell's book "Mars and its canals," with an alternative explanation.* (London: Macmillan, 1907) pp. 102-110.

Activity: Visit the online exhibit from Chicago's Adler Planetarium's "A Martian Sensation: Maps, Delusions, and the Mars Canals," which presents a history of Mars mapping efforts focused on the telescope era. Navigate through the entire slide show taking notes about anything interesting that stands out to you. What do you notice? What changes over time? What stays the same?

WEEK 6: SETTLEMENT

Will humans ever settle the Red Planet? Beyond whether it is physically possible we will grapple with questions of whether it is ethical and desirable.

Tuesday, November 1

Reading: Konrad Szocik, Rafael Elias Marques, Steven Abood, Aleksandra Kędzior, Kateryna Lysenko-Ryba, Dobrochna Minich, “Biological and Social Challenges of Human Reproduction in a Long-Term Mars Base” in *Futures*, 100 (2018) pp. 56-62.

Activity: Using NASA JPL’s “Mars Trek” mapping tool (similar to Google Earth) explore four sites on the surface that SpaceX has selected as potential future Starship landing locations. What do these locations have in common? Why do you think they were selected? What do you notice or think about in each location?

LINK: <https://trek.nasa.gov/mars>

- a. Arcadia Planitia
- b. Erebus Montes
- c. Utopia Planitia
- d. Phlegra Montes

Take a moment to familiarize yourself with the map’s functionality. To display the map as a 3D globe, see “Projections,” and to locate sites of interest on the surface, use the “Data” panel and “Fly-To” function.

WEEK 7: CONSPIRACIES

From the “face” on Mars to present-day citizen pseudoscientists combing over rover photos circling rocks shaped like out-of-place objects, this week focuses on understanding the history and mechanics of conspiratorial beliefs about Mars and how non-scientific information is produced and circulated.

Tuesday, November 8

Reading: Robert Brotherton, *Suspicious Minds: Why We Believe Conspiracy Theories* (Bloombury Sigma, 2015)

SITE: <http://www.spacearch.com/>

VIDEO: <https://vimeo.com/311829201>

3) HASSELL + EOC: Mars Habitat

SITE: <https://www.hassellstudio.com/project/nasa-3d-printed-habitat-challenge>

VIDEO:
<https://www.youtube.com/watch?v=AlrH01N9AsE>

4) ICON/NASA: Simulated Mars Surface Habitat

SITE: <https://www.iconbuild.com/updates/icon-3d-prints-the-first-simulated-mars-surface-habitat-for-nasa>

VIDEO:
<https://www.youtube.com/watch?v=hGueqKpQACY>