

# Mars – PTYS, ASTR, GEOL 442/542

Kuiper Space Sciences Room 312 Tues/Thurs 11:00 am-12:15 pm

**Instructor:** Lynn Carter, [lmcarter@email.arizona.edu](mailto:lmcarter@email.arizona.edu)

**Office Hours:** Tuesday 12:30-1:30 after class, Wednesday 1-2 pm (or by appointment), 533 A Kuiper Space Sciences Building

**Website:** [d2l.arizona.edu](http://d2l.arizona.edu)

**Course Objectives:** This course is an in-depth look at Mars, and students who take this course should come away with an understanding of current Mars research, datasets, controversies, and exploration. In particular, this course will focus on Mars geology and geography, the evolution of Mars climate and atmosphere through time, the search for life on Mars, and Mars exploration. The U of A has a large concentration of Mars experts and we will have occasional guest lecturers that will provide a different perspective and more details about specific topics.

This course is intended for upper level science and engineering majors and for science graduate students, and as such, we will focus on understanding the current state of Mars knowledge and research, as well as on reading science papers, writing journal-type articles, and presenting science to a knowledgeable audience. Undergraduates should leave the course with a new understanding of how we study Mars, the major questions we're trying to answer, and how to find and use Mars data and scientific papers. Graduate students should gain a broad introduction to the Mars literature and datasets, and have a chance to spend time specifically delving into topics relevant to their research interests.

**Readings:** There is no textbook for this course. The reading material for this course will be science journal articles, which will be placed online (1-2 per week for most weeks). Some of the material in class will be drawn from these articles. In addition, students will be expected to find and read articles associated with their final project.

## Grading Scale and Policies:

The assessment for this course focuses on reading scientific papers, critically analyzing science texts, writing in a science journal style, presenting science material to others with a science background, and accessing and analyzing science data of Mars. The course components will have the following weights:

	Undergraduates	Graduate students
Homework	35%	25%
HiRISE image analysis and report	20%	20%
Graduate student presentation of topic	-	10%
Final Project Report	20%	20%
Final Project Presentation	15%	15%
Class Participation	10%	10%

Final letter grades will be assigned as follows:

- A: 90% or higher
- B: 80 - 89%
- C: 70 - 79%
- D: 60 - 69%
- E: Below 60%

Graduate students will have different requirements for the final project, and will also be responsible for presenting a topic of their choice (with instructor approval) to the class. The presentation will be half of a class period (~30 min) and will be an opportunity for the undergraduates to learn from their classmates and for the graduate students to present a topic they are interested in. I may request that these presentations also include some basic material to make sure that we cover course materials in a coherent way. In addition, graduate student work will be graded at a higher level, commensurate with the added experience that the graduate students bring to writing and presenting scientific work. Graduate students may also have different instructions for some homeworks.

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.

**HiRISE project:** The High Resolution Imaging Science Experiment (HiRISE) camera on Mars Reconnaissance Orbiter is headquartered and operated from the U of A. Prof. Alfred McEwen, the HiRISE Principle Investigator, has agreed to help students target, acquire, and analyze new images of Mars using this camera. More details will be provided in class. For undergraduates, this is an opportunity to see how spacecraft data are obtained, and for graduate students, this can be used to learn how to request and use HiRISE data or to acquire images of relevance to their interests and research. For graduate students that have used HiRISE before and really would like to do something new, other options may be available – come talk to me.

### **Final Project:**

There will be no final exam in this class. Instead, students are expected to prepare a final paper and presentation on a topic of their choice that will demonstrate their understanding of the current state of Mars knowledge. This can be related to the HiRISE image that was requested, or be completely separate. Some of the homeworks will be geared at encouraging you to start work on this early. Students will also present a summary of their research paper at the end of the course.

For undergraduates, the final project will involve reading scientific papers on a topic of interest and writing a research paper summary of the science in the style of a planetary science or geology journal article. Graduate students may either prepare a short project involving new data analysis, or compose an “annual reviews” style article summarizing the state of the field for the topic of choice and providing a critical analysis with suggested future work. More details about the final project will be provided in class.

### **Class Participation and Absences:**

Please come to class and participate. There is no textbook, and while lectures will be posted online, reading the notes can't replicate the course discussion and will likely make it harder to write and present about the material. Since part of the course goals center around discussing and presenting Mars science, class participation will be noted and comprise part of the final grade.

- 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>

**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>.

**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 the Disability Resource Center (520-621-3268) to establish reasonable accommodations. For additional information on the Disability Resource Center 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.

**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/codeofacademicintegrity>  
<http://deanofstudents.arizona.edu/academic-integrity/students/academic-integrity>

Plagiarism will be checked for using Turnitin software. The proper forms of quoting other sources will be outlined in class. For UA policies against plagiarism, see the Student Code of Academic Integrity above. Note that it is also a violation to turn in the same work for multiple classes without prior approval.

**UA Nondiscrimination and Anti-Harassment Policy**

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

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.