

Graduate Student Syllabus Fall 2025

Course Number and Title

PTYS GEOS 520 Meteorites

Instructor Information

Jessica (Jess) Barnes, Associate Professor, jjbarnes@arizona.edu, rm 540 Lunar and Planetary Laboratory, and office hours in person/zoom by appointment.

Course Description

Meteorites are 'free' samplings of extraterrestrial worlds. In this course, we will explore the varied types of meteorites, their classification, chemistry, age, exposure history, and affinity to ancient and existing bodies in the solar system. We will discuss what meteorites are, how and why they arrive on Earth, how and where they are collected. We will investigate each class of meteorite in turn building a picture of the composition of our solar system and how it formed and evolved. Our study will involve a mixture of discussion, written and oral assignments, and a laboratory assignment. This is a 3-credit course.

Course Prerequisites or Co-requisites

PTYS 510 desired.

Course Format and Teaching Methods

Course Modality – Live in person with small-group activities, a group projects, and in-class discussion.

Course Objectives

The objective of this course is to provide students with an in-depth understanding of the scientific value of meteorites. We will approach this topic from a cosmochemical/petrological point of view. We will begin by revising the basics of mineralogy and chemistry, meteorite classification, then a class-by-class discussion of each type of meteorite (unmelted and melted), followed by a discussion of how the knowledge gaps that exist can be addressed through sample return.

Expected Learning Outcomes

- Demonstrate an understanding of what meteorites are and how to identify them.
- Demonstrate an understanding of how meteorites are classified.
- Participate in a group activity using laboratory-derived datasets to classify 'unknown' meteorites. Students will develop team skills and analyze real data.

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- Prepare and present a short review on a meteorite group and field questions that arise.
- Describe and discuss some of the current major science questions in the field of meteoritics.

Schedule of Topics and Activities

Weekly schedule of topics and laboratory activities.

Week	Date	Topic	Date	Topic
1	08/25	L1. Introduction & meteorite 101	08/27	L2. Meteorite 101
2	09/01	Labor Day, No Class	09/03	L3. Meteorite classification
3	09/08	L4. Minerals	09/10	L5. Isotopes I
4	09/15	L6. Isotopes II	09/17	L7. Geochemical tools
5	09/22	L8. Chondrites classification	09/25	L9. Chondrites I
6	09/29	L10. Chondrites II	10/01	L11. Micrometeorites & IDPs*
7	10/06	L12. Organics*	10/08	L13. Impact processes
8	10/13	L14. Aqueous alteration*	10/15	L15. Asteroid-meteorite connections
9	10/20	Lab	10/22	Lab
10	10/27	L16. Protoplanetary Disk I	10/29	L17. Protoplanetary Disk II
11	11/03	L18. Iron meteorites	11/05	L19. Inclusions and stony irons
12	11/10	L20. HEDs & Angrites	11/12	JB on travel, No Class
13	11/17	L21. Lunar Meteorites	11/19	L22. Martian meteorites I
14	11/24	L23. Student presentations	11/26	L24. Martian meteorites II
15	12/01	L25. Aubrites & ureilites	12/03	L26. Primitive achondrites
16	12/08	L27. Incipient melting*	12/10	L28. Wrap up

*Guest speaker

Assessments

Schedule of assignments with due dates and weight of final grade.

Assignment item	Assignment Due Date	Approx. Grade item release Date	% Final Grade
Attendance and participation in class discussions and activities	n/a	12/15	10
Individual homework #1	09/12	09/19	12.5
Individual homework #2	10/03	10/10	12.5
Group mystery meteorite report	11/07	11/21	30
Individual paper presentations	12/01	12/03	15
Individual sample request	12/10	12/15	20

Unless otherwise communicated by the instructor, all assignments (in .pdf form) will be **submitted to D2L** via the assignments tab. All assignments are due by **5PM MST** on the due date (Table above).

Except for emergency situations or if prior arrangements have been made, will late submissions be graded.

Final Examination or Project

There are no exams in this course.

Grading Scale and Policies

A	≥ 90
B	80 to 89
C	70 to 79
D	60 to 69
E	< 60

Required Texts and Materials

There is no formal textbook assigned for the course; however, students will be required to read on average 1 or 2 papers per week as assigned in class. Resources like e-books, review papers, papers for in-class discussion, etc. will be made available on D2L under the 'resources' tab.

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.

Safety on Campus and in the Classroom

For a list of emergency procedures for all types of incidents, please visit the website of the Critical Incident Response Team (CIRT): <https://cirt.arizona.edu/case-emergency/overview>

Also watch the video available at

https://arizona.sabacloud.com/Saba/Web_spf/NA7P1PRD161/common/learningeventdetail/crtfy000000000003560

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>

Use of Generative Artificial Intelligence (AI)

Different classes have different rules around the use of AI. In this course any and all uses of generative artificial intelligence (AI)/large language model tools such as ChatGPT, Dall-e, Google Bard, Microsoft Bing, etc. will be considered a violation of the Code of Academic Integrity, specifically the prohibition against submitting work that is not your own. This applies to all assessments in the course, including written assignments, discussions, and problem sets. This course policy is driven by the learning goals and desired learning outcomes for the course outlined above.

The following actions are prohibited in this class:

- entering all or any part of an assignment statement or test questions as part of a prompt to a large language model AI tool;
- incorporating any part of an AI-written response in an assignment;
- using AI to summarize or contextualize reading assignments or source materials; and
- submitting your own work for this class to a large language model AI tool for iteration or improvement.

University Policies

All university policies related to a syllabus are available at: <https://catalog.arizona.edu/syllabus-policies>.

Subject to Change Notice

Information contained in the course syllabus, other than the grade and absence policies, may be subject to change with reasonable advance notice, as deemed appropriate by the instructor of this course.

Graduate Student Resources

University of Arizona's Basic Needs Resources page: <http://basicneeds.arizona.edu/index.html>