

Instructor: Prof. Jessica (Jess) Barnes, jjbarnes@arizona.edu, Kuiper Space Sciences, Room 540. LPL web page: <https://www.lpl.arizona.edu/faculty/jessica-barnes>

Course Website: Course materials will be uploaded to the GEOS/PTYS 520 course page on D2L (<https://d2l.arizona.edu/d2l/home/1003432>, NetID login is required) as the semester progresses.

Course Prerequisites:

- Undergraduate students: PTYS 407/416; Graduate students: PTYS 510

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 class.

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.

Schedule of Topics:

Day	Date	Class Topic
W	01/13	Introduction and syllabus
M	01/18	MLK - no class
W	01/20	Mineralogy & meteorite components [will be recorded due to Presidential Inauguration]
M	01/25	Basic chemistry and isotopes
W	01/27	Meteorite Classification and Carbonaceous chondrites
M	02/01	Carbonaceous chondrites
W	02/03	Connecting meteorites to asteroids*
M	02/08	Ordinary chondrites
W	02/10	Other chondrites
M	02/15	Primitive achondrites
W	02/17	Stony irons
M	02/22	Irons [potentially recorded]
W	02/24	Space weathering *
M	03/01	Micrometeorites*
W-M	03/03-08	Lab project**
W	03/10	Reading day - no class
M-W	03/15-17	LPSC - no class
M	03/29	Angrites
W	03/31	HEDs
M	04/05	Lunar meteorites
W-M	04/07-12	Martian Meteorites*
W-M	04/14-19	Student presentations
W	04/21	Reading day - no class
M	04/26	Anomalous achondrites
W	04/28	Sample return missions
M	05/03	Big picture connections and questions
W	05/05	review and recap class goals and experience

*Guest lecturer. **Possible in-person lab activity, COVID-19 pandemic dependent.

Expected Learning Outcomes: At the end of the course, students should be able to:

- Demonstrate an understanding of what meteorites are.
- Demonstrate an understanding of how meteorites are classified.
- Participate in a group activity using laboratory-derived datasets to classify ‘unknown’ meteorites. This is designed to develop team skills and to provide experience classifying real samples.
- 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.

Performance Metrics:

Task	% final grade
Class participation (reading, discussions, Q&A, lab project etc...)	8%
First Quiz (syllabus; due 01/13)	2%
Homework (x2)* (due 01/27 and 02/10)	20%
Mid-term exam (due 03/05)	15%
Group Lab Projects (due 04/02)	20%
Student presentations (see class schedule)	20%
Final	15%

*graded equally.

Grading Scale (%):

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

Class Modality: The course will operate via the mode ‘flex in-person’ but as the pandemic changes we must be ready to adapt. I ask that you remain flexible and patient this semester. Below are the modes in which we will learn beginning with remote learning. If we make the move to in-person meetings, this will be communicated in preceding online classes, on D2L, and via email.

(a) Meeting times for remote teaching: We will be meeting remotely until we decide to commence with in-person meetings. We will meet Monday and Wednesday from 9:30 to 10:45 AM by Zoom. Classes will be held synchronously, unless otherwise stated. Classes will be recorded to facilitate asynchronous learning.

(b) Meeting times and patterns for in-person teaching: When the COVID-19 situation permits safe teaching and learning on campus, we will meet in room 312 in the Kuiper Space Sciences building on Monday and Wednesday from 9:30 to 10:45 AM. Again, this will be communicated to everyone via email. We will continue to record classes even if we move to in-person mode to facilitate synchronous remote learning and asynchronous learning for those not returning to campus.

Office Hours: Office hours can be scheduled on an as needed basis via email.

Makeup policy: Students who register after the first class may make up missed assignments/quizzes with a due date defined by instructor.

Textbook: 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.

Final Exam: The date and time of the final exam or project, along with links to the Final Exam Regulations, <https://www.registrar.arizona.edu/courses/final-examination-regulations-and-information> , and Final Exam Schedule, <http://www.registrar.arizona.edu/schedules/finals.htm> .

Recording Classes: Classes will be recorded and distributed via D2L. D2L is secure and requires UA NetID to access. Students will be able to download the Zoom recordings from D2L or play them directly on D2L by selecting the ‘View Topic’ option beside each video. Such class recordings are for instructional purposes only and students are prohibited from sharing these with anyone outside of the GEOS/PTYS 520 class. *Please note that students may not modify content or re-use content for any purpose other than personal educational reasons. All recordings are subject to government and university regulations. Therefore, students accessing unauthorized recordings or using them in a manner inconsistent with UArizona values and educational policies are subject to suspension or civil action.*

Equipment and Software Requirements: For this class you will need daily access to the following hardware: laptop or web-enabled device with webcam and microphone; regular access to reliable internet signal; ability to download and run the following software: Zoom, web browser, Adobe Acrobat, etc.

Missed Deadlines: It is recommended that work be uploaded in a timely manner to avoid upload issues or technical problems. If circumstances beyond your control prevent you from completing an assignment or uploading/submitted material by the due date this must be communicated to the instructor on the due date via email (jjbarnes@lpl.arizona.edu).

Incomplete (I) or withdrawal (W): 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>.

Dispute of Grade Policy: Any disputes regarding a grade on a paper, project or exam must be communicated to the instructor within one week of receiving the grade.

Virtual and In-Person Classroom Attendance:

- If you feel sick or may have been in contact with someone who is infectious, stay home. Except for seeking medical care, avoid contact with others and do not travel.
- Notify the instructor if you will be missing an in person or online course.
- Campus Health is testing for COVID-19. Please call (520) 621-9202 before you visit in person.
- Visit the UArizona COVID-19 page for regular updates.

Face Coverings are Required in Our Classroom: Per UArizona’s Administrative Directive, face coverings that cover the nose, mouth, and chin are required to be worn in all learning spaces at the University of Arizona (e.g., in classrooms, laboratories and studios). Any student who violates this directive will be asked to immediately leave the learning space and will be allowed to return only when they are wearing a face covering. Subsequent episodes of noncompliance will result in a Student Code of Conduct complaint being filed with the Dean of Students Office, which may result in sanctions being applied. The student will not be able to return to the learning space until the matter is resolved.

Physical Distancing is Required in the Classroom: During our in-person class meetings, we will respect CDC guidelines, including restricted seating to increase physical distancing and appropriately worn face coverings. Per UArizona’s Administrative Directive, face coverings that cover the nose, mouth, and chin are required to be worn in all learning spaces at the University of Arizona (e.g., in classrooms, laboratories and studios). Any student who violates this directive will be asked to immediately leave the learning space and will be allowed to return only when they are wearing a face covering. Subsequent episodes of

noncompliance will result in a Student Code of Conduct complaint being filed with the Dean of Students Office, which may result in sanctions being applied. The student will not be able to return to the learning space until the matter is resolved.

- The Disability Resource Center is available to explore face coverings and accessibility considerations if you believe that your disability or medical condition precludes you from utilizing any face covering or mask option. DRC will explore the range of potential options as well as remote course offerings. Should DRC determine an accommodation to this directive is reasonable, DRC will communicate this accommodation with your instructor.

Classroom Behavior Policy: To foster a positive learning environment, students and instructors have a shared responsibility. We want a safe, welcoming, and inclusive environment where all of us feel comfortable with each other and where we can challenge ourselves to succeed. To that end, our focus is on the tasks at hand and not on extraneous activities (e.g., texting, chatting, making phone calls).

Life/Academic Challenges: If you are experiencing unexpected barriers to your success in your courses, or have questions about this class, please contact the instructor as soon as possible and we will work to sort something out. Your faculty mentor and/or advisor will also be happy to talk with you about any issues that may arise during the semester; we understand this is a challenging time for everyone.

Physical and Mental-Health Challenges: If you are facing physical or mental health challenges this semester, please note that Campus Health provides quality medical and mental health care. For medical appointments, call (520-621-9202. For After Hours care, call (520) 570-7898. For the Counseling & Psych Services (CAPS) 24/7 hotline, call (520) 621-3334.

Academic Integrity Policy: The Student Code of Academic Integrity prohibits plagiarism: deanofstudents.arizona.edu/policies-and-codes/code-academic-integrity.

Nondiscrimination and Anti-Harassment Policy: Please see University Policy 200E on prohibited behaviors: <http://policy.arizona.edu/human-resources/nondiscrimination-and-anti-harassment-policy>

Threatening Behavior Policy: The UA policy on threatening behavior prohibits threats of physical harm to any member of the University community: <https://policy.arizona.edu/education-and-student-affairs/threatening-behavior-students> .

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