

**Class meeting times and location:** Tues, Thur 9:30-10:45 a.m. in Kuiper Space Sciences Building, 312

**Instructor:** [Renu Malhotra, Professor of Planetary Sciences](#)

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Office hours: Stop by anytime or email me for a guaranteed time.

**Class Web Page:** Students will need a UA Net ID to access the class web page at <http://d2l.arizona.edu>.

**Course content and expected learning outcomes:** This course is an introduction to the "minor planets" --- the asteroids, comets, Kuiper Belt objects, and dwarf planets. These small celestial bodies constitute the debris left over from the processes of planet formation and, as such, hold physical and chemical clues to almost the entire history of the solar system. We will review the current state of knowledge about their spatial distribution, their physical characteristics and chemical compositions, their origin and evolution, as well as techniques of study. Students will acquire a broad overview of the natural processes that govern our solar system and of the techniques that planetary scientists use to extend our knowledge.

**Textbook:** There is no required textbook. The following books provide review articles and background on the topics that we will cover, but we will also use papers from the current planetary science literature.

*Asteroids III*, pub: University of Arizona Press, yr: 2002

*Asteroids IV*, pub: University of Arizona Press, yr: 2015

*Comets II*, pub: University of Arizona Press, yr: 2004

*The Solar System Beyond Neptune*, pub: University of Arizona Press, yr: 2008

*Asteroids, Comets and Dwarf Planets*, au: Andrew S. Rivkin, pub: Greenwood, yr: 2009

Copies of most of these books are on reserve at the LPL library (Space Sciences 409) and are also available for in-library use in the UA Library's Special Collections. Some may also be available electronically in the UA libraries.

**Class format:** Most class meetings will be built around reading assignments. We will combine traditional lectures, open discussions and student-led presentations, according to topic and material. (There will be some group activities outside of the classroom - see below.) Students will be expected to be prepared with the material assigned prior to each class. Although no formal attendance record will be made, class participation will be part of the grade, and homework assignments are likely to make more sense if you've been to class.

**Required Extra-curricular Activities:** There are three planned activities that will take place outside the classroom. (1) Students will spend an evening at the telescope of one of the largest asteroid search programs in the world, the Catalina Sky Survey, which is conducted at the UofA's facilities at Mount Lemmon; the estimated time commitment is six hours, including travel time. (2) Students will make a field trip to our extensive meteorite collection which is housed in the Drake Building; the estimated time commitment is two hours. (3) Students will conduct a reflectance spectroscopy experiment (in small groups) in a departmental laboratory; the estimated time commitment is three hours.

**Final examination/Term paper due date:** The schedule for final exams is set by the UofA's Registrar. Please review the final exam schedule here: <http://www.registrar.arizona.edu/schedules/finals.htm>. The final exam regulations are here: <http://www.registrar.arizona.edu/courses/final-examination-regulations-and-information>. For this course, the Final Exam is scheduled for Tuesday, Dec. 11, from 8:00 to 10:00 a.m. Therefore the term paper (in lieu of a Final Exam) will be due at this time.

**Grades:** Regular grades are awarded for this course: A B C D E. Grading scale: A > 90% ; B = 80.1 - 90%; C = 70.1 - 80%; D = 60.1 - 70%; E < 60%. The instructor reserves the right to adjust these grade boundaries to her expectation of class performance.

**400 level expectations:** Students will be expected to actively participate in class and will be required to complete a number of homework assignments, a mid-term exam, and a term paper (in lieu of a final exam). In addition, 3% of the grade will be

for coming to meet with me at some point on or before October 18.

*500 level expectations:* All of the above for 400-level, plus students will be expected to (i) to research the literature on one of the primary topics and to lead the class discussion on it, and (ii) include some original work in their term paper.

400 level Grading: Meeting with instructor: 3%; Class participation: 10%; Homework assignments: 28%; Mid-term exam: 24%; Term paper: 35%.

500 level Grading: Meeting with instructor: 3%; Class participation: 10%; Leading a topic: 10%; Homework assignments: 20%; Mid-term exam: 22%; Term paper: 35%.

**Absences:** Please inform the instructor at least one week in advance of any anticipated absences, and as soon as possible of any unforeseen absences. 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 preapproved by the UA Dean of Students (or dean's designee) will be honored; see <http://policy.arizona.edu/employmenthuman-resources/attendance>.

Assignments are due in class on the due date. I would rather have late work than no work, although students should expect any late work to be for reduced credit. If you anticipate an absence on the due date of an assignment, please either turn in your work early or discuss alternative arrangements with me.

**Classroom Behavior:** We try to keep the classroom clean, and ask for your help. Please do not bring any food or drink (other than bottled water) into the classroom. The common sense rules of good conduct apply, such as cell phones turned off and no web-surfing or irrelevant activity during class. Please review the UA policy on disruptive behavior: <http://policy.arizona.edu/education-and-student-affairs/disruptive-behavior-instructional-setting>.

**Threatening Behavior:** The UA Threatening Behavior by Students Policy prohibits threats of physical harm to any member of the University community, including to oneself. Please review the policy: <http://policy.arizona.edu/education-and-student-affairs/threatening-behavior-students>.

**Academic integrity:** Students are encouraged to share intellectual views and discuss freely the principles and applications of course materials. However, work that will be graded 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 <https://deanofstudents.arizona.edu/academic-integrity/students/academic-integrity>.

The University Libraries have some excellent tips for avoiding plagiarism, available at <http://new.library.arizona.edu/research/citing/plagiarism>. Two main points you need to know are these: (1) When you turn in (or present) work that uses published material (journal articles, web sites, etc.), you are expected to give the appropriate credit and cite the source(s). (2) Collaboration is encouraged on most assignments, as I strongly believe that we learn more by asking questions and verbally explaining our answers to others' satisfaction. However, when you do collaborate with someone, the work you turn in for grading must be written by you *in your own words* and you must *acknowledge the collaboration* in a clear statement.

**Nondiscrimination and anti-harassment:** The University of Arizona is committed to creating and maintaining an environment free of discrimination; see <http://policy.arizona.edu/human-resources/nondiscrimination-and-anti-harassment-policy>.

**Accessibility and Accommodations:** At the University of Arizona we strive to make learning experiences as accessible as possible. If you anticipate or experience physical or academic barriers based on disability or pregnancy, you are welcome to let me know so that we can discuss options. You are also encouraged to contact Disability Resources (520-621-3268) to explore reasonable accommodation.

Please be aware that the accessible chairs in our classroom should remain available for students who find that standard classroom seating is not usable.

**Notice:** 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.