

PTYS 395
Mercury: Open Questions and New Data
Syllabus – Spring 2008

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Topic and aims of the course

It has been over 30 years since the last (and only) spacecraft, Mariner 10, investigated the planet Mercury. During that time, exhaustive analysis of these spacecraft data and further observations by ground-based instruments have yielded a wealth of information, yet many open questions remain. For example, visual imagery of Mercury covers only 45% of the surface at scales of a few hundred meters to a kilometer per pixel. This coverage is not dissimilar to the data available for the lunar surface before the beginning of the space program.

The Messenger spacecraft is poised to complete its first flyby of Mercury this January, with subsequent flybys planned for October 2008 and September 2009. It is an appropriate time to review the current state of knowledge about Mercury, and assess what open questions may be addressed by the Messenger mission.

This seminar class will focus on reviewing the scientific literature on research of Mercury and discussion of new Messenger data in that context. All aspects of Mercury's geology and geophysics are open for discussion, although the arrival of the Messenger data during the semester is expected to strongly affect what topics are given most weight.

What students should know coming into this course:

Students will be expected to read research articles and make presentations on these papers to the class. Extensive discussion and class participation is expected of all members.

There are no explicit course prerequisites and anyone may enroll; however, this course is intended for juniors and above. Some of the reading may be technical and some background knowledge of terrestrial geology would be of great benefit. Students are welcome to attempt the course without a planetary-science or geological background, although extra effort is likely to be required on their part. Please speak to the instructor if you have any questions.

Textbooks:

There are no required textbooks in this class. Assigned reading will be provided by the instructor in hardcopy or electronic form. The optional textbooks "Mercury" from the Arizona press space science series, edited by Villa, Chapman and Matthews, and "Exploring Mercury: The Iron Planet" by Strom

and Sprague are recommended and much of the assigned reading will be drawn from these sources.

Times and locations:

- One Session per week on Wednesday from 2pm to 3:30pm.
- First lecture on Wednesday, January 16th.
- Lectures will be held in room 309 of the Kuiper Space Sciences building.

Professor Byrne will be available for questions and discussion, from the end of each lecture until 5pm. If you need help and cannot make these times then please contact him by email to make another arrangement.

Course Website:

All class material and general information on the course will be posted on a class website at:

http://www.lpl.arizona.edu/~shane/PTY5_395_MERCURY

Course credit and workload:

This is a seminar-style class, so class members are expected to participate in the discussions. Being able to participate in the discussions will require the student to have done the reading in advance. We will have one session per week, with a likely reading load of 1-2 papers (or book chapters) for each session.

Each student will also be asked to lead the discussion for one session during the semester. This will involve putting together a short presentation on that weeks reading. Students will need to understand the material in 'their' week well enough to field any questions from the class, the instructor can help the student prepare if they need help with background knowledge.

Grading policy:

Final results will be letter grades and determined from:

Attendance and class participation	75%
Student's own presentation	25%

Grades will be assigned according to the following scale.

90-100%	A
75-89%	B
60-74%	C
50-59%	D
0-49%	E

Grades will not be rescaled to ensure that any particular statistical distribution is met.