

Geology 4200/5200-05

Planetary Geology

Fall 2009

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Office Hours: Monday 11:00 – 11:50

Wednesday 11:00 – 11:50 and 2:10-3:00

Other times by appointment. You can also just stop by, and if I'm in and free I'll be happy to talk with you.

Class web site: <http://faculty.gg.uwyo.edu/rhowell/classes/planetary_geology/>

Text Book: None required

There isn't any up-to-date planetary geology text available aimed at senior level students. We'll use some chapters from the first two references listed below, which are on reserve in the Geology Library, and we will rely heavily on papers from the scientific literature and from other references.

General Planetary References on reserve in the geology library

The Solar System (2nd edition) J. A. Wood 2000 Prentice-Hall

(A very general overview of solar system formation and other background material.)

Exploring the Planets (2nd edition) E. H. Christiansen and W. K. Hamblin 1995 Prentice-Hall

(More detail on geologic processes on specific planets, and on solar system formation.)

The New Solar System (4th edition) J. K. Beatty et al. (ed.) 1999 Sky Publishing Corp.

(Review of solar system bodies and processes at an advanced "Scientific American" level)

I will also be placing additional books and papers on reserve for specific topics.

Course Format and Grading

Two meetings per week will use standard lecture format. The third meeting (usually Friday) will at least in part be student led reports and discussions of more advanced material assigned from the research literature or other references. There should be the opportunity for each student to be involved in two or three presentations during the semester. You will receive a grade for the last of these presentations. I may also require a short (2-3 page) written summary of this last presentation.

Homework will be assigned each week, usually due the following week. I encourage students to work together to decide how to complete the homework, but in the end I want each student to separately work the problems or write the text which they turn in.

There will be a midterm exam and a final exam. The final will be comprehensive, but will concentrate on the material towards the end of the class.

Grades will be computed as follows:

Homework	30%
Last Presentation:	20%
Midterm exam	20%
Final Exam	30%

Graduate Version (5200-5): Students registered for the graduate version of the course should expect additional or alternate (more-sophisticated versions) of homework and exam questions. They will also be expected to produce a more sophisticated presentation of the papers assigned from the current literature.

Material to be covered:

Origin of the Solar System

- Origin of the elements
- Condensation and accretion in the solar nebula
- Evidence of early history from meteorites, asteroids, and comets
- Effects of large early collisions (earth-moon system)

Impact Cratering Processes

- Lunar crater morphology & lunar stratigraphy
- Dating of surfaces using cratering records

Comparative Planetology

- Thermal history vs. planetary size
- Origin & retention of atmospheres and volatiles
- Relative cratering rates and crater retention

Specific Examples: (We'll cover in detail ~3 topics from the following partial list)

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|---------------------|--|
| Moon and Asteroids: | Remote sensing of composition |
| Mars: | Surface (including glacial) processes |
| Io: | Tidal heating; sulfur and ultramafic volcanism |
| Titan: | Volatiles and surface processes |
| Enceladus: | South polar plumes, possible subsurface ocean |

Statements required by the College

Academic Honesty: I encouraged you to study together and also to discuss among yourselves how to complete homework assignments and to review for the exams. However, the final answers for homework you turn in must be your own calculations and your own writing. The answers on the exams must be your work alone. The in-class presentations will be group projects, with each member of a group receiving the same grade for their final presentation.

Academic dishonesty is defined in University Regulation 802, Revision 2, as “an act attempted or performed which misrepresents one’s involvement in an academic task in any way, or permits another student to misrepresent the latter’s involvement in an academic task by assisting the misrepresentation.” The University has procedures to judge possible violations, and can impose serious penalties.

A&S - Students and Teachers Working Together: A 5-page document with guidelines for instructors and students is available at: <http://uwadmnweb.uwyo.edu/a&s/Current/students_teachers_work.htm>

Disabilities: If you have a physical, learning, or psychological disability and require accommodations, please let the instructor know immediately. You will need to register with, and provide documentation of your disability to, University Disability Support Services (UDSS) in SEO, room 330 Knight Hall, 766-6189, TTY: 766-3073.