

Syllabus – Spring 2011 – PTYS/GEOS 554  
**Evolution of Planetary Surfaces**

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Instructor: Shane Byrne  
524 Kuiper Space Sciences, (520) 626-0407, [shane@lpl.arizona.edu](mailto:shane@lpl.arizona.edu)

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**Times and locations:**

- Two lectures per week on Tuesday and Thursday from 9.30 to 10:45am.
- First lecture on Thursday, January 13<sup>th</sup>.
- Lectures will be held in room 312 of the Kuiper Space Sciences building.

I'll be available for questions and discussion, from ~after-lunch until ~4pm on Tuesdays and Thursdays. If you need help and cannot make these times then please contact me by email to make another arrangement.

**Course Website:**

Lectures, homework assignments and general information on the course will be posted on a class website at:

[http://www.lpl.arizona.edu/~shane/PTYS\\_554](http://www.lpl.arizona.edu/~shane/PTYS_554)

**What students should know coming into this course:**

This course is intended for beginning graduate students and is required for students of Planetary Science. There are no course prerequisites and anyone may enroll (undergraduates must be seniors to enroll for credit).

**What students should know coming out of this course:**

Planetary surfaces sit at the interface between the planet's atmosphere and interior and are also often exposed to exogenic processes like impacts and space-weathering. This makes them very complex to understand, but also rich historical archives that record changing conditions on that planet over the course of solar system history.

In this class, we will explore how a variety of geologic processes, such as impact cratering, volcanism, tectonics, fluvial and atmospheric, shape planetary landscapes.

**Course credit (i.e. the part that is important to read...):**

There will be no final or mid-term exam in this course, students get credit for homeworks, fieldtrips, participation in a reading group and a final course project.

- Homework will be assigned every two weeks in class on Thursdays. In general, this homework will be due two weeks from the date on which it is assigned. Some of these assignments may be based on analysis of spacecraft data. Late homework receives half credit and homework

submitted a week or more after the due date receives no credit. If you are unable to complete a homework assignment on time (and have a good reason) you must come talk to me *before* the due date to avoid losing credit.

- There are two field-trips during this class. One of these trips will be combined with the usual field-trip class, PTYS 594 (so a smart student would enroll in both classes to get four units of credit for the price of three). These trips will be a few days long each and involve camping and moderate hiking, see the PTYS594 class website for details and examples of past trips (<https://pirlwww.lpl.arizona.edu/wiki/Fieldtrip>). Participation in the PTYS594 trip means picking a topic in advance that you can brief the class on while we're out there. You'll need to produce a 2-3 page handout to go with this talk, which can consist almost entirely of figures with minimal text (indeed the best handouts are like this).
- We will have a paper discussion group that will meet weekly for an hour. At each session, a student will pick a paper and lead a discussion of its content and various merits and flaws. Each enrolled student will do this twice over the semester; however, all students need to read all papers to participate in the discussion. Marks for the 'paper discussion group' section are based both on the sessions the student leads and participation in the other sessions. We'll be a small group, so it's *painfully* obvious to everyone when someone hasn't bothered to read the paper.
- A final course project will be required of all students on some subject relevant to the content of the course. Students are encouraged to interact with me early in the semester to choose a topic for their project. A ~10-15 minute oral presentation to the class (during finals week) and written report on this project will be due at the end of the semester.

Homeworks/Labs	20%
Final project - Oral	20%
Final project - written	20%
Fieldtrip participation	20%
Paper discussion group	20%

Grades will be assigned according to the following scale. I don't rescale grades to ensure that any particular statistical distribution is met.

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

**General Policies:**

Students are encouraged to discuss approaches to solving homework problems and their class projects with each other; however, all work submitted must be the student's own. Previously completed course projects may not be submitted for credit in this course.

Since this is a graduate-only class there's no lecture attendance policy, you have the responsibility for learning all the material.

**Topics and Timetable:**

<b>Week starting</b>	<b>Lecture 1</b>	<b>Lecture 2</b>	<b>Notes</b>
1/10	No Lecture	Introduction & Forming Planetary Crusts	
1/17	Forming Planetary Crusts	Forming Planetary Crusts	
1/24	Gravity and Topography	Gravity and Topography	
1/31	Tectonic Processes	Tectonic Processes	
2/7	Planetary Heating	Volcanic Processes	Fieldtrip 1 (PTYS 594) 2/11-2/14
2/14	Volcanic Processes	Volcanic Processes	
2/21	Impact cratering	Impact cratering	
2/28	Impact cratering	Surface processes on airless bodies	
3/7	Weathering & fate of sediments	Aeolian Processes	LPSC week (Probable cancelation)
3/14	No Lecture (Spring Break)	No Lecture (Spring Break)	
3/21	Aeolian Processes	Fluvial Processes	
3/28	Fluvial Processes	Fluvial Processes	
4/4	Solar system ices	Solar system ices	
4/11	Solar system ices	EXTRA	Fieldtrip 2: Flagstaff area 4/15-4/18
4/18	Glacial/Periglacial processes	Glacial/Periglacial processes	
4/25	History of the inner solar system	History of the inner solar system	
5/2	History of the inner solar system	No Lecture (Reading Day)	