

Syllabus – Fall 2012 – PTYS/GEOS 554  
**Evolution of Planetary Surfaces**

---

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

---

**Times and locations:**

- Two lectures per week on Tuesday and Thursday from 2 to 3:15pm.
- First lecture on Tuesday, August 21<sup>st</sup>.
- Lectures will be held in room 312 of the Kuiper Space Sciences building.

I'll be available for questions and discussion, after lectures on Tuesdays and Thursdays. If you need help and cannot make these times then please email me 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 with little previous exposure to geosciences 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.

**Semester Specific Info:**

- No lectures on 9/11 or 9/13: I'll be out of town for a HiRISE team meeting (makeup lectures are a possibility).
- Our class fieldtrip will be Friday 9/21 to Sunday 9/23 to the Flagstaff area.

**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, a fieldtrip, 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 is a field-trip during this class which will be a few days long 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>.
- 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. In lieu of a mid-term, there will be an LPSC-style abstract on your project due in the middle of the semester.

Doing something connected to your ongoing research is a good strategy, but if you do this then the work you do for your class project should be clearly-defined i.e. some self-contained aspect of your research rather than a direct continuation of what you were doing anyway.

This project is the bulk of the grade so you should expect to put some serious work into it

Homeworks/Labs	20%	
Fieldtrip participation	20%	
Project: Mid-term abstract	15%	60%
Project: Finals Week Oral	20%	
Project: Final Write-up	25%	

Grades are 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:**

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

Since this is a graduate-only class there's no lecture attendance policy – you can do what you chose in that regard. You have the responsibility for learning all the material.

**Topics and Timetable:**

Expect minor adjustments throughout the course.

<b>Week starting</b>	<b>Lecture 1</b>	<b>Lecture 2</b>	<b>Notes</b>
8/20	Course Introduction & Forming Planetary Crusts	Forming Planetary Crusts	
8/27	Forming Planetary Crusts	Gravity and Topography	
9/3	Gravity and Topography	Tectonic Processes	
9/10	<b>HiRISE Team Meeting</b>	<b>HiRISE Team Meeting</b>	No Lectures
9/17	Tectonic Processes	Planetary Heating	554 Fieldtrip 9/21-9/23
9/24	Volcanic Processes	Volcanic Processes	
10/1	Volcanic Processes	Impact cratering	
10/8	Impact cratering	Impact cratering	
10/15	Surface processes on airless bodies	Weathering & fate of sediments	
10/22	Aeolian Processes	Aeolian Processes	594 Fieldtrip 10/26-10/28
10/29	Fluvial Processes	Fluvial Processes	
11/5	Fluvial Processes	Solar system ices	
11/12	Solar system ices	Solar system ices	
11/19	Glacial/Periglacial processes	<b>Thanksgiving</b>	
11/26	Glacial/Periglacial processes	History of the inner solar system	
12/3	History of the inner solar system	<b>No Lecture (Reading Day)</b>	