Planetary Geology

GEOLOGY 307

Spring 2018 **Tuesday & Thursday 9:30 -10:50 a.m.**

C. M. Bailey

Office- McStreet Hall 215 **x12445** **cmbail@wm.edu**

Preamble

Space, the Final Frontier! Although the Earth provides a rich tapestry for geologists, other planetary bodies in our Solar System are equally worthy of study. Many of the same processes that operate on Earth modify these worlds, but each planet is unique in many respects. Planetary bodies also contain a record of the solar system's history. The goals of this course include a better understanding of the processes that operate on distant worlds, gaining insight into how the Solar System has changed through time, and thinking about the future opportunties in planetary science. This class will not simply be a tour of the planets, nor will it attempt to answer all the questions normally dealt with in Astronomy and Cosmology courses. We will start from observations and use a judicious amount of mathematics, physics, and chemistry to achieve our goals. At semester's end we hope you will have developed an understanding of the Solar System, a sense for the new and exciting discoveries in planetary science, as well as an appreciation of the important questions still to be answered.

Week	*Dates*	*Topic*	*Readings*
1	Jan. 18	~~Planetary Geology Introduced~~ WHOOPS!	Ch. 1
2	Jan. 23, 25	Planetary Geology Introduced The Universe: matter, stars, planets, and life- oh my!	Ch. 1
3	Jan. 30, Feb. 1	Celestial Mechanics	Ch. 2 Ch. 5, pg. 64-67
4	Feb. 6, 8	Solar System Formation Meteorites are Mighty Important	
5	Feb. 13, 15	The Terrestrial Planets: Mercury, Venus, Earth & Mars Humans to Mars, A National Goal: Why Mars? Why Humans? ***Problem Set #1 due, Tues., Feb. 13***	
6	Feb. 20, 22	The Interior of Planets Tectonics	Ch. 3, 4 Ch. 5, 6
7	Feb. 27, Mar. 1	Volcanism ***Mid-term Exam, Thur., Mar. 1st***	Ch. 7
	Mar 3- 11	SPRING BREAK	
8	Mar. 13, 15	Impacts and Impactors	Ch. 8
9	Mar. 20, 22	Planetary surfaces	Ch. 11

10	Mar. 27, 29	Planetary atmospheres and oceans	Ch. 9,10
11	Apr. 3, 5	Climates of the planets ***Problem Set #2 due, Thur., Apr 5***	
12	Apr. 10, 12	Geochemical & biogeochemical cycles: Building a habitable planet- The origin of the atmosphere, the oceans and life	
13	Apr 17, 19	***Mars Landing Sites- Group Presentations***	
14	Apr 24, 26	The search for life beyond Earth and the Solar System	Ch. 12

FINAL EXAM- Thur., May 3 9 a.m. - noon

GRADING

Problem Sets (2)	20%	Group Research Project	15%
Mid-Term Exam	20%	In-Class Participation	10%
Final Exam	35%		

Text- *Planetary Geology: An Introduction*, 2013 (2nd edition) by C. Vita-Finzi and D. Fortes

This text is relatively comprehensive and includes a number of useful mathematical treatments. However, it is not always an easy read. We expect you will read the text, primarily as a useful reference volume. There will be ***other readings*** that will be assigned during the course of the semester and posted to the class Blackboard site.

Problem Sets- Two problem sets will be assigned during the semester. Problems will be quantitative in nature and lots of fun. Start working on the problems early and drop by our office if you have questions.

Group Research Project/Poster- An important component of this class will be a group (3 people) independent research project that will focus on understanding the geology of a specific region on Mars. You will acquire, manipulate, and analyze data from a region on Mars. Your findings will be presented at a poster session that we will hold in class during the 3rd week of April.

In-Class Activities/Exercises- This class is menat to be more than just lecture so during almost every class there will be some type of in-class activity/exercise. These activities are designed to get you thinking and make you an active participant in learning. Some of the questions/exercises will be similar to those on problem sets and exams.

Web Resources- Much, but not all, of the course materials on Blackboard- *http://blackboard.wm.edu/*. These will include class presentations, course assignments, answers keys, and ancillary readings.

Office Hours-
Bailey- Wednesday- 1 - 4 p.m, McStreet Hall 215