

PS 120 - Planetary Science for Teachers  
Fall, 2015

Time:	Tues./Thurs. 12:00 pm - 1:15 pm
Instructor:	Dr. Jon M. Saken
Office:	S178 (Science Bldg.)
Phone:	696-2753
E-mail:	saken@marshall.edu
Office Hours:	Mon. 2:00-4:00 pm Wed. 1:00-3:00 pm
Final Exam:	Tues., Dec. 10, 12:45 pm - 2:45 pm
Required Text:	<i>Planetary Science for Teachers</i> (Pearson Custom Text)

**Catalog Description:** A conceptual study of the Earth's relation to the other members of the solar system and its place in the Universe. Part of a 3 course sequence for K-9 education majors. (*3 hours*)

**Fuller Course Description:** In comparison with the rest of the solar system, the Earth is unique in many ways. Its oceans, dynamic surface, and the presence of life set it apart from the other planets. Yet it also shares a common early history, a common initial composition, and was shaped by many of the same processes as the other planets. Studying both the similarities and differences between the Earth and its "family" members leads to a greater understanding of the entire solar system, as well as its place in the larger Universe.

This course will, to a large extent, follow a "flipped" classroom model. Readings and other resources should be studied outside of class. Lecturing will kept to a minimum so that as much class time as possible can be spent on interactive learning.

<b>Grading:</b>	Homework	15%	A	90 - 100
	Tests (3)	15%	B	80 - 89
	Activities	20%	C	70 - 79
	Final Exam	20%	D	60 - 69
			F	0 - 59

**Homework:** Homework will be conducted using the textbook publisher's online system: <http://www.pearsonmylabandmastering.com/>. An access code should have been bundled with the textbook, otherwise, you may pay for an access code online. Please note that the course ID is different from the access code. The course ID is: saken87685

*A Note on Homework:* Please do the homework. Please allow enough time on the homework so that you can think about your responses and pay close attention to the questions. It is not intended to be mere busy work but is instead an important part of the learning experience. Believe it or not, education research has been conducted to show what may be obvious - students who do the

homework for themselves (not copying off of someone else or looking up the answers online) do much better in the class.

I can't make you do the homework. I can't make sure that you always do it for yourself. But I can guarantee that you will severely lower your chances of getting a good grade, or even passing, if you don't do the homework. *So, please do the homework.*

**Activities:** A good fraction of the class will be devoted to working on individual and group exercises designed to aid your understanding of the material. They will also provide you an important check on your understanding of the material. Therefore, regular class attendance will be crucial to your success in this course.

Examples include Lecture Tutorials, "Think-Pair-Share" exercises, Fermi questions, and Ranking Task exercises. As these are designed to be completed during class time, makeups, in general, will not be possible, so don't miss class! However, a few of the activities will be independent investigations/observations to be completed outside of class.

**Exams:** A total of three (3) exams will be conducted throughout the semester, comprised of a variety of question types. Note that material from the activities *WILL* be included on the exams.

Test Dates: September 21st, October 22nd, November 19th.

**Final Exam:** The final exam *WILL* be cumulative.

### University Policies:

By enrolling in this course, you agree to the University Policies listed below. Please read the full text of each policy by going to <http://www.marshall.edu/academic-affairs> and clicking on "Marshall University Policies." Or, you can access the policies directly by going to: [http://www.marshall.edu/academic-affairs/?page\\_id=802](http://www.marshall.edu/academic-affairs/?page_id=802)

Academic Dishonesty/ Excused Absence Policy for Undergraduates/ Computing Services Acceptable Use/ Inclement Weather/ Dead Week/ Students with Disabilities/ Academic Forgiveness/ Academic Probation and Suspension/ Academic Rights and Responsibilities of Students/ Affirmative Action/ Sexual Harassment

### Course Policies:

- Any work handed in late will suffer a 20% penalty per **calendar** day. This does not apply for any day for which there is an excused absence.
- Makeup work will **NOT** be allowed except for *documented* emergencies.
- If you must miss a class contact me immediately. Also, be sure to let me know at least a week ahead of time if a university activity will require an absence from class.
- Cell phone use is not permitted in the classroom. Please turn cellphones to OFF or vibrate while in class.

- Except for calculators, *all other electronic devices must be turned off in class*. Laptops, tablets, etc.
- Any act of academic dishonesty of any kind will result in a final grade of F for the class.

## **Learning Outcomes:**

*Practice:* Homework & Activities

*Assessment:* Unit Exams & Final Exam

*Outcomes:*

- Make observations at different times of year to relate the amount of daylight to the time of year.
- Develop and use a model of the Earth-sun-moon system to describe the cyclic patterns of lunar phases, eclipses of the sun and moon, seasons, and patterns that can be predicted.
- Develop and use a model to describe the role of gravity in the motions within galaxies and the solar system.
- Analyze and interpret data to determine scale properties of objects in the solar system.
- Support an argument that the apparent brightness of the sun and stars is due to their relative distances from the Earth.
- Construct a scientific explanation based on evidence from rock strata for how the geologic time scale is used to organize Earth's 4.6-billion-year-old history.
- Use and share observations of local weather conditions to describe patterns over time.
- Ask questions to obtain information about the purpose of weather forecasting to prepare for, and respond to, severe weather.
- Make observations and/or measurements to provide evidence of the effects of weathering or the rate of erosion by water, ice, wind, or vegetation.
- Construct an explanation based on evidence for how geoscience processes have changed Earth's surface at varying time and spatial scales.
- Represent data in tables and graphical displays to describe typical weather conditions expected during a particular season.
- Obtain and combine information to describe climates in different regions of the world.
- Analyze and interpret data from maps to describe patterns of Earth's features.
- Analyze and interpret data on the distribution of fossils and rocks, continental shapes, bodies of water, and seafloor structures to provide evidence of the past plate motions.

- Develop a model using an example to describe ways the geosphere, biosphere, hydrosphere, and/or atmosphere interact.
- Develop a model to describe the cycling of water through Earth's systems driven by energy from the sun and the force of gravity.
- Develop and use a model to describe how unequal heating and rotation of the Earth cause patterns of atmospheric and oceanic circulation that determine regional climates.
- Obtain and combine information to describe that energy and fuels are derived from natural resources and their uses affect the environment.
- Construct a scientific explanation based on evidence for how the uneven distributions of Earth's mineral, energy, and groundwater resources are the result of past and current geo-science processes.
- Compare multiple solutions designed to slow or prevent wind or water from changing the shape of the land.
- Analyze and interpret data on natural hazards to forecast future catastrophic events and inform the development of technologies to mitigate their effects.
- Obtain and combine information about ways individual communities use science ideas to protect the Earth's resources and environment.
- Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment.
- Construct an argument supported by evidence for how increases in human population and per-capita consumption of natural resources impact Earth's systems.
- Ask questions to clarify evidence of the factors that have caused the rise in global temperatures over the past century.