

**GLG 105 Introduction to Planetary Science: Lecture and Laboratory**

**Credits/Periods:** 4 credits/4 periods. Transfers to ASU, UA, and NAU and may be used toward satisfaction of the SG requirement for AA, AAS, and AGS degrees; or the Physical Science requirement of the TGECC degree program.

**Course Description:** An introduction to the study of the surfaces of the terrestrial planets, moons, and small bodies in our solar system and the processes that shape them.

**Class Pre-requisites:** None

**Time/Place:** Lecture: ONLINE Lab: M 2:30-5:00 PM (PS-173) – **Note: All exams will take place during lab periods**

**Instructor:** Steve Kadel **Office:** PS-107 **Office Phone:** (623) 845-3618

**Office Hours:** ONLINE – Daily; On Campus: M,F 10:00-11:00, T 11:00 AM -12:00 PM; W 3:30-4:30 PM, R 2:00-3:00 PM; by appointment

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**Texts:** Lecture - *ENCYCLOPEDIA OF THE SOLAR SYSTEM (2<sup>nd</sup> Ed.)* – McFadden, Weissman and Johnson (Eds)

ISBN 978-012-088589-3; Laboratory – GLG 105 Introduction to Planetary Science Lab Manual (Fall 2011 Edition)

**Welcome to GLG105!** For the next 16 weeks, we will be studying the surfaces of the terrestrial (that is, those with a solid surface) planets, moons and small bodies in our solar system. We will learn the basic processes and landforms that are common to all planetary bodies in our solar system, and a bit about those unique to certain bodies. We will focus on the processes that produce features on the surfaces of the planets, and the use and interpretation of images sent back from numerous spacecraft missions to the planets by the United States, Russia/Soviet Union, European Space Agency (ESA), Japanese Space Agency (JAXA) and Indian Space Research Organization (ISRO). Current mission data will be reviewed and discussed, and students will actively use the Internet to keep up with NASA and international space missions. All online work will be done via Blackboard (this is the system you probably already use to check your grades for all classes).

Here is the Blackboard login page link: <https://ecourses.maricopa.edu/webapps/login/>.

**Course objectives-** after successfully completing this course, you will be able to:

- Log onto the Internet and find information about virtually any space mission
- List the four major categories of physical processes that shape planetary surfaces
- Recognize and describe landforms resulting from the four types of physical processes
- Compare and contrast the general characteristics of the surfaces of the terrestrial planets, moons, and small bodies
- Describe and discuss evidence for past existence of liquid water on the surface of Mars and why that might be important
- Describe and discuss past, current and planned planetary exploration missions and their results
- Discuss why Earth is uniquely hospitable to life among the planets and where we might find evidence of life beyond Earth
- Describe, compare and contrast at least 2 types of remote sensing data
- Perform basic mapping and measurements from planetary images
- Demonstrate your familiarity with the surfaces of multiple different types and sizes of bodies in our solar system
- Tell your friends/relatives a little about each of the terrestrial planets, explain why NASA missions are worth their cost (or not), and be the conversational life of any party!

There will be **quite a bit of reading** for this class, especially since the lecture portion is “online”, which means on your own time, with discussion of the material via Blackboard with your fellow students and instructor. Reading will average about 1.5 chapters per week, but some weeks have one chapter, others 2, and three weeks have 3 or 4. Don’t worry – I will assign critical *parts* of chapters, rather than the whole things! I will also periodically assign supplemental reading (usually a web page or pages with good images and descriptions regarding the topic(s) of the week) that will assist in both your discussions and in completing homework assignments. Be sure to keep up with the reading (i.e., don’t leave it to the Sat. before assignments are due!) so that you can discuss the material and ask questions throughout the week before the Sunday due dates. You should expect to spend about 8-10 hours per week reading, discussing and doing your HW assignments. Remember, this would include

the normal 3 hours of “class time” of a traditionally offered class, so it’s more like lecture class plus 5-7 hours. The lab period is “in person” and completes your 4 credits. All exams will take place then.

### ***Resources and Study Strategies - How to get the most out of this class***

Geology is a physical science course. Science courses are generally not easy for most people and usually take a bit of work. In addition, we all learn differently. Some of us are very analytical, whereas others may prefer a more "hands-on" approach. Still others may prefer more discussion and visual aids. There are many resources and study strategies available to you, including:

- The “Lecture”** - The online notes, discussions, and textbook readings are your primary resources for this course. For most of the topics I will provide a brief introduction, list your assigned reading, discussion topics and homework questions, and then begin each discussion thread. **Read carefully. Explore online liberally. Discuss objectively and with factual information. Reference the information you find (simply citing the web address is perfectly fine). Ask lots of questions!**
- Discussion Threads** – The heart of the online part of this hybrid course will be the discussions you have with other students, and the instructor, via Blackboard. Each week I will post from 2 to 4 discussion topics. Each student will be expected to participate in each one with at least 1 substantive post. A substantive post is one where you discuss an idea (or ideas) involving factual information about the subject at hand. For instance: “I wasn’t aware that there was water ice in the polar areas of the Moon. It must stay very cold there all the time. I read it may reach temperatures down to minus 400° F there! <http://news.softpedia.com/news/Moon-s-Shadows-Cold-Enough-to-Freeze-Nitrogen-130101.shtml>.” Note the web address (“hyperlink”) included at the end to point fellow students to your source. ALWAYS include this! This can be an excellent way to enhance the learning process for all and is highly encouraged! The more you discuss, the more you will get out of this class. Additional posts responding to your fellow students are encouraged, too (e.g., “That’s surprising, Joe. How did you find that site?”), but at least one must be of this “substantive” nature.
- The Textbook** – You MUST obtain a copy of the book or arrange some other consistent weekly access to it (Library, etc.). Your textbook has been specifically chosen out of many potential texts to address the content of the course in the most up-to-date, most complete, and visually rich manner available. General reading assignments for each course topic are listed in the accompanying course schedule. Specific pages from each chapter (I won’t assign all of each chapter!) will be posted with your assignments at the beginning of each week (Sunday afternoon or evening). ***I will expect that you have read this material prior to posting to the discussions.*** Exam material will come from reading assignments, discussion topics, homework assignments, and topics covered in labs.
- Field Trips** - There will be 2 field trips during the semester - 1 during class where we will travel to a local site of interest, ASU’s Space Photography Laboratory, and an optional weekend Extra Credit field trip (includes one night of tent camping) when we will visit numerous sites of planetary interest in northern Arizona, including Meteor Crater, Sunset Crater, Montezuma’s Well, etc. ***HIGHLY RECOMMENDED - REALLY BRINGS THE SCIENCE CONCEPTS HOME; YOU’LL HAVE A GOOD TIME, TOO!***
- Talking online (and in person) with the Instructor** - you will find that I love to talk about the planets, so don’t be shy about asking questions. I know that many of you may not be at all familiar with the other planets before this class. Why take the class if you already know it all?! That’s perfectly fine. We’ll learn about them together this semester. Ask lots of questions!
- The Lab** - A planetary science laboratory period is a required part of GLG105 (SG Credit). The lab is coordinated with the lecture classes and is designed to give you "hands-on" experience with many of the planets, images and processes we discuss in lecture. The lab will be Monday afternoons from 2:30 PM to 5:00 PM. You should plan on the lab taking the full time each week.

### ***Help on the way!***

Many students enter this class with anxiety - "I'm not really a "scientific" person" or "Science classes have always been difficult for me." Other students may have various disabilities including test anxiety, which may make traditional classroom environments very difficult. Fear not, almost all such students preceding you have passed this course - many with very high grades! The success of many of these students, though, was in part because they took advantage of the many programs offered to help! Both the College and the Physical Science department provide special programs to address the various needs of our students. These programs include:

- GeoAssist** - a program where you can get tutorial help on the course content directly from one of the geology instructors, in an informal, easy-going environment. GeoAssist is usually held during my office hours in PS107 (hours for this semester will be posted on the door of PS-107 after the first week of classes, and are also online at the beginning of this syllabus). Bring your questions, confusions, & problems - or just use it as time to practice under the supervision of an instructor.
- Center for Learning (CL)** - The CL provides free support services for all students to assist in improving student learning. These services include: (1) Scheduled and "drop-in", group and one-on-one tutoring in most academic subjects - including geology; (2) Multimedia instructional materials in basic skills areas (English, Reading, Math); and (3) Study Skills Workshops. The CL location and hours of operation are given in your Student Handbook. **Tutoring specific to GLG105 is unlikely to be available, but general geology/GLG101 tutoring is nearly always available.**
- Disabled Student Resources (DSR)** - The DSR center at Glendale C.C. provides a wide variety of services to students with disabilities which otherwise might impair their ability to function in the typical or online classroom setting. Hearing-impaired students may be provided with a trained "signer" who translates my lab lectures in real time. DSR provides reading services and word enlargement services for visually impaired students, and administers quizzes and examinations to such students. Any student who has any recognizable disability that he/she feels may impair their ability to meet the course requirements and expectations should contact me and DSR during the first week of class to see how we can accommodate and facilitate your completion of this course.
- Counseling Center** - The Counseling Center provides students with career counseling, one-on-one counseling, personal counseling, personal development counseling and acts as a "clearinghouse" - guiding students to the other services available on campus. Further information on the Counseling Center is provided in your Student Handbook, found online at: [General Catalog and Student Handbook](#)
- Child Care Resource** - According to campus policies, only those students enrolled in a particular class are permitted to attend that class. Consequently, children of students are not allowed in the classroom. For help finding emergency or permanent childcare, call the Child Care Resource @ (602) 244-2678.

## Grading

Grading for this course will be based on 6 short quizzes, 5 homework assignments, 4 full-period regular lecture exams, a semester project, a final exam, and 14 lab exercises. Labs will consist of computer-based exercises, hands-on investigations, mapping exercises, and one or two local field trips (during lab time). Letter grades will be assigned on a straight 10% basis: 90-100% = A; 80-89% = B; 70-79% = C; 60-69% = D; 0-59% = F. Points below are based on a total of 700. Total points may be changed slightly during the semester. The lowest of your quiz scores will be dropped. The lowest of your regular exam scores will also be dropped. Extra credit will be offered for a total of approximately 25 points during the semester, distributed among the quizzes, exams and labs.

Point distribution:	
Topical Discussion Boards: 150 pts (30 @ 5 pts)	
Open-ended Discussion Boards: 80 pts (16 @ 5 pts)	A = $\geq 787.6$ pts
Homework: 150 pts (10 @ 15 pts)	B = 699.6-787.5 pts
Group PowerPoint Project: 50 pts	C = 611.6-699.5 pts
Exams: 300 pts (Best 3 of 4 @ 100 pts)	D = 523.6-611.5 pts
Labs: 150 pts (13 @ 10 + 1 @ 20)	F = $< 523.6$ pts
<b>Total: 880 pts.</b>	

- Exam formats:** Multiple choice, matching, listing, true/false, short answer. Exams will cover the reading assignments or material previously covered online and in labs since the last exam (except for the final, which is cumulative). Each student will take exams individually during the lab period.
- Lab Exercises:** Each Monday (except holidays) we will meet in person to do graded lab exercises. On weeks where there is a Monday holiday, online lab exercises will be assigned. Due by no later than 11:59 PM the following Sunday. Lab exercises cover geologic processes, landforms and concepts from the lecture.
- Group Project:** Groups of 4-5 will create a 5-slide PowerPoint on a planetary body to be presented near semester's end. You will be "meeting" online with your group members *every week*, starting with intros in Week 2.
- Optional Field Trip:** An *optional* overnight field trip (highly recommended!) will take place from 5/5/12 to 5/6/12. The field trip will include visiting volcanoes, astronaut training locations and Meteor Crater, in addition to other points of interest within 1.5 hours of Flagstaff, Arizona. We will camp near a developed campground outside of Flagstaff and eat at inexpensive local restaurants from dinner on Saturday through lunch on Sunday. Saturday lunch will be BYO - "in the field"/packed in coolers. Transportation is via GCC Van. Camping gear is not provided by GCC. Trip is fun, educational, and *highly recommended!*
- Discussion Boards:** Because the lecture portion of this hybrid class is online, no physical attendance in a classroom occurs. However, student participation in each of the weekly discussion topics is counted as active attendance in the class. **You must actively participate to remain in class.** All discussions are due by 11:59 PM each Sunday night, one week after they are assigned. **You will receive a grade of 0 (zero) for any posts not submitted on-time**, so don't wait until the last minute or you might miss out! There will also be a "general discussion" for each week, in which *everyone* must participate, also worth 5 pts/week. *Grading* is as follows (5 pts/week): Submitted at least one post: 1 pt; **Substantive** post (2 required per week): 2 pts. Substantive means that you added to the discussion by making your own unique points or discussing the points made by others in a thoughtful way. I will give feedback on posts to help you get the hang of it, but I may give 1 pt. to a post if it isn't quite "meaty" enough. "I agree" or "Yes/No" answers are not really discussions and so won't count toward your 2 substantive posts. Opinions are fine, **if** backed up with facts!
- Homework Assignments:** In addition to weekly discussion topics, there will be ten (10) 15 pt. homework assignments throughout the semester. All homework assignments will be designed for completion using the Internet and/or your text. Homeworks will be designed to enhance your exploration and understanding of selected topics from our readings and discussions, and will be submitted to me online. As with discussion posts, all homeworks will be due by 11:59 PM Sunday evening, which will be precisely one week after they are assigned. **Late homeworks WILL NOT be accepted.**

## General Class Policies

- Netiquette:** ALL posts must be respectful and non-explicit. If you wouldn't say it in front of your Grandma, don't post it! Disagreements and debate are fine, but be courteous and non-judgmental.
- Lab Attendance:** Students must attend and complete all labs. This is the only section of GLG 105, so no make-up lab periods are possible.
- Withdrawals:** *Withdrawals are not automatic.* If you wish to drop the course, it is your responsibility to complete the appropriate paperwork as prescribed by the Admissions Office. Students who withdraw

without completing a Drop/Add form will receive a grade of "F" or "Y". The last dates for student-initiated withdrawals are listed at the bottom of the course schedule.

•**Academic Misconduct and Academic Dishonesty** will not be tolerated. Students engaging in misconduct or dishonest practices on exams or projects will be dealt with according to the guidelines established in the Student Handbook. [http://www.gc.maricopa.edu/catalog/student\\_rights.html#copyright](http://www.gc.maricopa.edu/catalog/student_rights.html#copyright)

•**Audio/Visual Recording:** Neither audio nor video recording of lectures and lab exercises will be permitted\*.

\* Audio recording may be permissible through arrangements made with Disabled Student Resources.

**PLANNED CLASS SCHEDULE:**

**SECTION 16775**

**SR** = Supplemental Reading (Internet, Journal Articles, etc.) **MWJ** = McFadden, Weismann and Johnson (your text)

Week	Week of (Sunday)	Subject	Readings, HWs, etc.	Lab Exercises
1	1/15	<b>MLK Day – no in-class mtg.</b> Overview of the Solar System	<b>MWJ</b> Ch. 1; <b>HW 1</b> ; Dbs 1 & 2	<b>ONLINE LAB:</b> Web Surfin' Across the Solar System
2	1/22	Origin of the Solar System	<b>MWJ</b> Ch. 2; <b>HW2</b> ; Dbs 3 & 4	Student Solar System Model 1; <b>Group Project Planning***</b>
3	1/29	Solar System Studies – Pre-Space Age; Planetary Volcan.	<b>MWJ</b> Chs. 3 and 44; <b>HW3</b> ; Dbs 5 & 6	Build Your Own Volcano
4	2/5	Earth	<b>MWJ</b> Chs. 9 & 10; <b>HW4</b> ; Dbs 7 & 8	Impact Cratering
5	2/12	Impact Cratering	Dbs 9 & 10 <b>MWJ</b> Ch. 43	<b>Exam #1</b> Intro to Surface of Moon*** Lunar Mapping 1
6	2/19	<b>Presidents' Day – no in-class mtg.</b> The Moon	<b>MWJ</b> Ch. 12 + <b>SR</b> ; <b>HW5</b> ; Dbs 11 & 12	<b>ONLINE LAB:</b> Mercury
7	2/26	Mercury – Surface and Interior	<b>MWJ</b> Ch. 6 + <b>SR</b> ; <b>HW 6</b> ; Dbs 13 & 14	Tectonism Demo*** Moon Maps Due
8	3/4	Venus	<b>MWJ</b> Ch. 7 + <b>SR</b> ; Dbs 15 & 16	<b>EXAM #2</b> ; Radar Mapping and the Surface of Venus***
9	3/11	<b>SPRING BREAK</b>	<b>No Readings or HW</b>	<b>NO LAB EXERCISE</b>
10	3/18	Meteorites and Near-Earth Objects	<b>MWJ</b> Chs. 13 & 14; <b>HW 7</b> ; Dbs 17 & 18	Meteorites and the Surfaces of Asteroids***
11	3/25	Mars	<b>MWJ</b> Chs. 15, 16, 17; <b>HW 8</b> ; Dbs 19 & 20	The Surface of Mars***
12	4/1	The Asteroid Belt	<b>MWJ</b> Ch. 18; <b>HW 9</b> ; Dbs 21 & 22	Earth-Mars Comparison***
13	4/8	Planetary Satellites; Jupiter's Large Moons	<b>MWJ</b> Chs. 19, 22-24; Dbs 23 & 24	<b>EXAM #3</b> ;The Moons of Jupiter and Saturn***
14	4/15	Moons of Saturn, Uranus and Neptune	<b>MWJ</b> Chs. 25, 26+ <b>SR</b> ; <b>HW 10</b> ; Dbs 25 & 26	The Moons of Uranus and Neptune***
15	4/22	Pluto, the Kuiper Belt, and Comets	<b>MWJ</b> Chs. 29-31, 33; Dbs 27 & 28	Build Your Own Comets***
16	4/29	Astrobiology; Upcoming Planetary Missions/New Data	<b>MWJ</b> Chs. 45 & 46+ <b>SR</b> ; Dbs 29 & 30; <b>Ppt Projects Due</b>	<b>Group Project Presentations</b> Student Solar System Model 2
17	5/6	<b>FINAL EXAM on 5/7/12</b>	<b>2:30 PM-5:00 PM</b>	<b>NO LAB</b>

\*\*\*Indicates computers used in lab

Last day for student-initiated withdrawal with a guaranteed grade of "W": 3/2/12

Last day for student-initiated withdrawal, with a grade of "W" or "Y": 4/23/12

**THESE WITHDRAWAL DATES ARE ABSOLUTE AND NON-NEGOTIABLE!**

*Course content may vary slightly from this outline to meet the needs of this particular group. The instructor reserves the right to alter the schedule via verbal announcements or instructions in class EXAM AND HW DATES ARE APPROXIMATE. The student is responsible for noting such changes and acting accordingly - even if the student was absent on the day such announcements were made, so be sure to KEEP CURRENT online and don't leave your discussions or assignments to the day or two before they're due!*

**THIS PAGE MUST BE PRINTED, SIGNED, DATED, AND TURNED IN TO THE INSTRUCTOR  
IN PERSON (DURING LAB PERIOD) NO LATER THAN MONDAY, January 30, 2012.**

I acknowledge that I have received a syllabus for the course described above. I have read it and understand the attendance, withdrawal, grading and other policies. I recognize that to complete this course, I may need to spend 2 to 3 hours of study outside of class for every hour spent in class.

Signature: \_\_\_\_\_

Printed Name: \_\_\_\_\_

Date: \_\_\_\_\_

**Questionnaire:**

Have you ever had a course in Geology, Earth Science or Astronomy prior to this one?

If yes, when and where (list all courses including labs)?

How much Physics, Physical Science, Chemistry, and Math have you had?

Are you (choose answer that is closest to your situation):

- (A) A geology or astronomy major?
- (B) Exploring the possibility of majoring in geology or astronomy?
- (C) Unsure of what you're majoring in?
- (D) Sure that you are majoring in something other than geology or astronomy? If so, what is your major?
- (E) Other (please explain)?

What do you hope to get out of this course?

What (if any) part of planetary science do you think will be most interesting to you?