syllabus

GEOL 64 Planetary Science

General Information: GEOL 64 Planetary Science ( class ID 48980) Spring, 2022, in-person class

College: Queens College

Department: School of Earth and Environmental Science

Course section, Day and Time of Class Meetings: Mo We 3:10PM - 4:25PM

Building and Room Number: currently unassigned

Instructor: William Blanford (william.blanford@qc.cuny.edu; 718 997-3303).

Emails will be answered within 48 hours.

Course Description:

Official Course Description: An introduction to the surface features, composition, geological activity, and probable history of the planets, moons, and comets of the solar system, based on the results of space exploration.

Instructor’s teaching philosophy and pedagogic approach: While inculcating knowledge of the class’s focus, the instructor’s teaching philosophy and pedagogic approach include student improving their proficiency in data analysis and technical writing. Data analysis will focus on the use of spreadsheets where students will be shown how to import and enter data, perform basic statistical analysis, create summary tables and produce common types of figures. On technical writing, students will be shown common approaches for creating formal reports including lessons on formatting text and graphics, language and document construction, and understanding the target audience. The format of the course will be two mid-terms (15% each), four homework assignments (5% each), one paper (20%), final (25%) and course participation (5%). In each non-exam class, 2-3 short breakout session will be held where students are broken into groups of 2-4 and formulate answers to commonly posed questions. After each class, they will submit their answers which will account toward their participation grade.

Textbook Information:

Required Text: Rothery, D., McBride, N., and I. Gilmour, Eds. An Introduction to the Solar System (Third Edition), Cambridge University Press, NY. ISBN-10: 1108430848.

Book is available through the Queens College bookstore as well as through major on-line book sellers. The book is commonly available for ~$40 in electronic form and ~$60 in paperback. The class is fully in-person, but the textbook will not be used while in class and thus students do not have to have access to the book in class.

Attendance Policy:

Attendance will not be recorded, however as mentioned each class where exams are not given a series of questions will be posed. Students will upload their answers to Blackboard and the answers to those will be evaluated applied for the determination of the student’s participation grade which is 5% of the course grade.

Discipline/Course Specific Learning Objectives:

LO1: Students will be able to describe and classify the major types of bodies within the Solar System.

LO2: Students will be able to define the major components of planets (metallic, rock, volatile gases and fluids), identify and be able to describe the processes that led to their differentiation, classify types of planets based on these and be able to predict the types of planets based on starting parent material, location within a solar system, and the type of star around which they formed.

LO3: Students will be able to assemble and compile various planetary parameters from provided sources in a data management software such as a spreadsheet, perform basic statistical analysis, compare parameters through the creation of common types charts, and develop simply empirical mathematical relationships using spreadsheets.

LO4: Students will be able to describe and interpret information from a range of common types of scientific charts and tables.

LO5: Students will be able to evaluate and select reputable sources of information related to planetary science and will learn methods to properly employ that knowledge into a technical report.

LO6: Students will describe trends and major events in the historic development of planetary science and reasonably describe current trends in US and foreign government policies and private sector initiatives.

CUNY Queens College Option

***This course satisfies the following two Queens College General Education criteria.***

QC 1: Address how, in the discipline (or disciplines) of the course, data and evidence are construed and knowledge is acquired; that is, how questions are asked and answered.

QC 2: Position the discipline(s) in the liberal arts curriculum and the larger society

***In Addition, this QC College Option SCI course satisfies the following three learning outcomes:***

SCI 1: Familiarity with a body of knowledge in the physical or biological sciences.

SCI 2: Successful study of the methods of science, including the use of observation, the information of hypotheses and the testing of models.

SCI 3: Experience and awareness of the impact of science on modern society.

**Course Calendar**

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| --- | --- | --- | --- | --- |
| **Class Meeting** | **Day & Date** | **Topic** | **Readings/ Assignments** | **Objectives/Criteria Met** |
| 1 | 1-Feb | Course Introduction; Review of History of Planetary Science and Culture | Provided Reading (PR) | LO6/QC1/SCI 3 |
| 2 | 3-Feb | The Sun and Other Stars | Ch1 |  |
| 3 | 8-Feb | Basics of Orbital Mechanic/demo of spreadsheets | PR | LO4/QC1/SCI1,2 |
| 4 | 10-Feb | Basics of Orbital Mechanic/demo of spreadsheets | PR/HW1 | LO3,4/QC1/SCI1,2 |
| 5 | 15-Feb | The internal structure of the terrestrial planets | Ch 2 | LO1,2,4/SCI1,2 |
| 6 | 17-Feb | The internal structure of the terrestrial planets | Ch 2 | LO1,2,3,4/SCI1,2 |
| 7 | 22-Feb | Terrestrial Planetary volcanism | Ch 3 | LO1,2,3,4/SCI1,2 |
| 8 | 24-Feb | Terrestrial Planetary volcanism | Ch 3/HW2 | LO1-5/SCI1,2 |
| 9 | 1-Mar | Terrestrial Planetary surface processes | Ch 4 | LO1,2,4/SCI1,2 |
| 10 | 3-Mar | Terrestrial Planetary surface processes | Ch 4 | LO1,2,4/SCI1,2 |
| 11 | 8-Mar | Atmospheres of terrestrial planets | Ch 5 | LO1,2,4/SCI1,2 |
| 12 | 10-Mar | Atmospheres of terrestrial planets | Ch 5 | LO1,2,4/SCI1,2 |
| 13 | 15-Mar | Exam 1 |  |  |
| 14 | 17-Mar | The giant planets (Jupiter) | Ch 6 and PR | LO1,2/SCI1,2 |
| 15 | 22-Mar | The giant planets (Jupiter) | Ch 6 and PR | LO1,2/SCI1,2 |
| 16 | 24-Mar | The giant planets (Saturn) | Ch 6 and PR | LO1,2/SCI1,2 |
| 17 | 29-Mar | The giant planets (Saturn) | Ch 6 and PR/HW3 | LO1,2/QC1/SCI1,2 |
| 18 | 31-Mar | The giant planets (Uranus) | Ch 6 and PR | LO1,2/SCI1,2 |
| 19 | 5-Apr | The giant planets (Neptune) | Ch 6 and PR | LO1,2,4/SCI1,2 |
| 20 | 7-Apr | Exam 2 |  |  |
| 21 | 12-Apr | Evaluating and Safe Utilization of Planetary Science Internet Sources | PR | LO5/QC1,2/SCI1,2 |
| 22 | 14-Apr | Survey of Solar System Moons | Ch 7 and PR | LO1,2/SC1,2 |
|  | 19-Apr | Spring Break |  |  |
|  | 21-Apr | Spring Break |  |  |
| 23 | 26-Apr | Survey of Solar System Moons | Ch 7 and PR | LO1,2/SCI1,2 |
| 24 | 28-Apr | The Moon | Ch 7/ PR /Paper Draft | LO1,2/SCI1,2 |
| 25 | 3-May | Meteorites: a record of formation | Ch 9 | LO1,2/SCI1,2 |
| 26 | 5-May | Solar System Origin and Evolution Theories | Ch 8 | LO1,2/QC1,2/SCI1,2 |
| 27 | 10-May | Solar System Origin and Evolution Theories | Ch 8/Paper due | LO1,2/QC1,2/SCI1,2 |
| 28 | 12-May | Exoplanets | PR | LO1,2,4/QC1/SCI1,2 |
| 29 | 17-May | Exoplanets | PR /HW4 | LO1,2,3/SCI1,2 |
| 30 | 19-May | Planetary Science Policy and Possible Futures | PR | LO6/QC /SCI3 |
|  | TBA | Final |  |  |

**Term Paper**

A short 800 to 1000 word paper is assigned. The paper will involve narrowly focus. Students may choose from: 1) One component (interior, surface features, or atmophere) of a single planetary body.

2) A single noteworthy comet or asteroid.

3) Planetary science in a specific ancient (eg Mayan) or component of modern culture (eg Life on Mars in cinema).

4) Planetary Science and commercial enterprise.

5) Other subject by approval of the instructor.

Students will be given a signup sheet and a limited number of students will be permitted to write on the same or similar subjects. Students are strongly encouraged to discuss their paper with professor. A draft of the report will be given to two of your classmates and they will be given an assignment on reviewing the paper. To assist in that effort, lessons on reviewing will be given. After those reviews, students will evaluate and incorporate comments that they found helpful. On the paper, 20% is the quality of the reference, 40% on the quality of the scientific content, 40% the quality of the writing (structure, design, etc). The paper will be submitted to Blackboard via Turnitin to evaluate for non-original content. Points will be lost for substantive levels of unoriginal content.

***Homework***

In this course, four homework assignments will be given. Students will have at least a week to complete them. Tardy assignment will only be accepted for credit if completed within 1 week after it is due and will receive a 15% point deduction. If you have a medical issue verified by a professional, then items can be turned in at a later date.

***Grading of Homework Questions***

95-100: Correct clearly stated answer with correct units, significant figures and following of guidelines for all components of the question.

85-94: Correct final answer with some errors on in formatting.

70-84: Errors leading up the final answer and/or with significant unit and presentation issues.

50-70: Significant errors in the answer.

0-49: Little to no effort given for an answer.

**Term and Final Exams**

1. Will be taken during class and the exam will consist of multiple choice and short-answer questions.

2. Grading rubric for nonmultiple choice qestion will follow that on homework.

3. No books or phones are allowed to be used. You cannot use a basic calculator.

4. Make up exams can only be taken with a medical excuse and may consist of the original exam, a term paper, or other form of examination.

**Final Exam:** The final will be commulative with roughly an equal number of questions drawn from each week’s lecture. It will have the same format as the mid-term exams.

**General Grading Policy and Grade-scale**

If the course has a statically signifcant number of students (>70), then the instructor will curve grades for this course. That will involve determination curve which will first excluded outlier scores (individual from poorly executed assignments and exams) from consideration. The remaining raw scores will be curved such that the final grade has an average of 87 with scores at the lower end far more shifted than those at the upper end due to the common existence of a log-normal distribution.

The grading scale will conform to the CUNY standard: A:100-93%, A-:90-92%, B+:87-89%, B:83-86%, B-:80-82%, C+:77-79%, C:73-76%, C-:70-72%, D+:67-69%, D:60-66%, F: 59% or below.

**Grade Determination**

The format of the course will be two mid-terms (15% each), four homework assignments (5% each), one paper (20%), final (25%) and course participation (5%).

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| --- | --- |
| **Term Paper** | **20%** |
| **Exams (two)** | **30%** |
| **Homework** | **20%** |
| **Inclass participation** | **5%** |
| **Final** | **25%** |

**Lecture Notes**

I will post a draft of lecture presentation (pdf) before (or soon after) each class and will post finalized versions later.

**Expected Time Commitment**

Besides lectures, it is expected that students will be spending on average 5 hours per week on assignments and studying for exams, but results may vary.

**Technical Support**

Email Helpdesk@qc.cuny.edu or call the Student Support Hotline (718-997-3000).

**Counseling Support**

<https://www.qc.cuny.edu/StudentLife/services/counseling/Pages/default.aspx>

**Statement On Student Wellness**

As a student, you may experience a range of challenges that can interfere with learning, such as strained relationships, increased anxiety, substance use, feeling down, difficulty concentrating and/or lack of motivation. These mental health concerns or stressful events may diminish your academic performance and/or reduce your ability to participate in daily activities. Counseling Services are free and available to any Queens College student. They can assist students with personal concerns that can affect their enjoyment of and success in college. Services are free and confidential. All sessions take place on Zoom or by Telephone, depending on student preference.

To make an appointment, students should call 718-997-5420 and leave a message with their phone number and cuny i.d. They can also e-mail [counselingservices@qc.cuny.edu](mailto:counselingservices@qc.cuny.edu). For further information see: <https://www.qc.cuny.edu/StudentLife/services/counseling/counseling/>

**CUNY’s Academic Integrity policy**

Academic dishonesty is prohibited in The City University of New York. Penalties for academic dishonesty include academic sanctions, such as failing or otherwise reduced grades, and/or disciplinary sanctions, including suspension or expulsion. For a full description of the CUNY policy see: <https://www.cuny.edu/about/administration/offices/legal-affairs/policies-procedures/academic-integrity-policy/>