

**Geology 545-002  
Planetary Geology  
Fall 2024 Syllabus**

**Meeting Times and Location**

Mondays 4:30 –7:10 pm  
Exploratory Hall 1005 (in person)

**Instructor**

Dr. Jules Goldspiel  
Department of Atmospheric, Oceanic and Earth Sciences (AOES)

Office: Exploratory Hall 3414  
Office Hours: Wednesdays 1:30–2:30 pm  
Other days and times by appointment  
e-mail: jgoldspi@gmu.edu (best contact method)

**Course Information**

3 Credits

Prerequisites: GEOL 101 (Physical Geology) or GEOL 102 (Historical Geology)

This course will focus on the geology and geologic processes relevant to the terrestrial planets, moons, and other Solar System bodies including dwarf planets, asteroids and comets. The emphasis will be on understanding past and present surface geologic processes. The geology of Earth will not be covered directly, but geologic features and processes on Earth will be compared and contrasted with those on other planetary bodies when relevant.

Participation in one Observation Night at the GMU Observatory outside of class hours is required.

The goals of this course are for students to:

- Attain a mastery of what is known and unknown about the surfaces and interiors of planets, moons and other Solar System bodies
- Become an expert on the range of geologic processes occurring throughout the Solar System today
- Develop an expertise in the evidence for different geologic processes that may have occurred on different Solar System bodies in the past
- Acquire a command of the tools and techniques used to study the geology and geologic history of planets, moons and other Solar System bodies

Students will find it helpful to have ready access to a scientific calculator or spreadsheet program.

**Recommended Course Textbook**

*Introduction to Planetary Geomorphology*, 2013, Ronald Greeley, Cambridge University Press.

**Grade Scale**

Grade	A+	A	A-	B+	B	B-	C+	C	C-	D	F
Weighted Score (%)	≥ 99%	92.0 – 98.9%	90.0 – 91.9%	88.0 – 89.9%	82.0 – 87.9%	80.0 – 81.9%	78.0 – 79.9%	70.0 – 77.9%	67.0 – 69.9%	50.0 – 66.9%	< 50%

Course grades will be determined by the weighted percentage of total points possible (see Required Coursework & Grading Weights). The base (i.e., standard) grade scale is as indicated in the table above. The grade scale is subject to change, but if any changes are made, it will be favorable to students (i.e., if the scale is changed, the cutoff for a grade would be at lower percentage not higher).

## Required Coursework & Grading Weights

The graded coursework for this class and the weight of each component is as listed in the table below.

Weight	GEOL 545 Coursework
10%	Quizzes (all combined)
10%	Homeworks (all combined)
5%	Observation Night participation
10%	Semester Exercise
10%	Independent Project
15%	Preliminary Exam I
15%	Preliminary Exam II
25%	Final Exam

Quizzes will cover facts and concepts from lectures. They will be released online through Blackboard and will check the mastery of the specific information and concept details discussed since the last quiz. Each quiz will consist of no more than 10 questions in multiple choice and/or short answer format.

Homework assignments will cover quantitative aspects of the course. They will generally involve expert application of calculations, graphing and/or data analyses related to topics discussed in class.

The Semester Exercise will involve collecting, summarizing and mastering planetary surface data using publicly available data and software tools.

The Independent Project will be a short, but detailed, data collection and analysis project of a specific type and for a specific planetary body chosen by the student in consultation with the instructor.

## Tentative Course Schedule

Semester Week	Date	Topic	Textbook Chapters	Quiz Assigned	Homework Assigned
1	08/26	The Solar System & Planetary Exploration	1, 2	#1	
2	09/02	<i>Labor Day – No Class</i>			
3	09/09	Planetary Geologic Processes	3		#1
4	09/16	The Moon & Surface Ages	4	#2	
5	09/23	Mercury & Planetary Body Cooling	5		#2
6	09/30	Venus & Relevance of Atmospheres to Planetary Surfaces	6	#3	
7	10/07	<i>Preliminary Exam I</i>			
8	10/14	<i>Fall Break – No Class</i>			
9	10/21	Mars System & Gradation	7		
10	10/28	Mars System & Basic Terrestrial Planet Property Comparisons			#3
11	11/04	Jupiter System & Tides	8	#4	
12	11/11	Saturn System & Ring Dynamics	9		#4
13	⊕ 11/18	Uranus System & Neptune System	10	#5	
14	11/25	<i>Preliminary Exam II</i>			
15	∅ 12/02	Dwarf Planets & Small Solar System Bodies			
16	12/09	Meteorites, Exoplanets & Course Review	11		
17	12/16	<i>Final Exam (4:30 pm – 7:15 pm)</i>			

⊕ Semester Exercise due

∅ Independent Project due

[TBD\*] Observation Night (Alternate date [TBD] if weather is bad on primary date)

\* Observation Nights are all weather permitting. Status will be announced on the scheduled day.

Note: Course content and schedule may be modified by the instructor as the semester progresses.

## Key Add/Drop/Withdrawal Dates

- Sep 03 Last day to add classes
- Sep 09 1<sup>st</sup> drop deadline (full tuition refund, no record on transcript)
- Sep 17 2<sup>nd</sup> drop deadline (50% tuition refund, no record on transcript)
- Oct 01 Last day for unrestricted Self-Withdrawal (no tuition refund, W on transcript)
- Oct 28 Last day for Selective Withdrawal (no tuition refund, W on transcript)

Note: Self-Withdrawal and Selective Withdrawal options are only available to undergraduate students

## Course Policies

Electronic Devices: The use of electronic devices (computer, tablet, phone and the like) is permitted during class. While in class, your phone ringer and any other audible alerts on your devices must be off. Be respectful of your peers and instructor and do not use your electronic devices to engage in activities that are unrelated to the class while class is in session. The instructor reserves the right to prohibit the use of electronic devices by any student whose use of a device is unrelated and/or disruptive to the class.

All standard university policies apply to the use of university computers and university computer systems for this course. Please see the GMU policies website for a summary of the university computer policies (<https://universitypolicy.gmu.edu/policies/responsible-use-of-computing/>).

Earbuds and headphones may not be worn at any time during class or during exams without an approved accommodation or prior approval from the instructor.

Calculators are the only aid that may be used during exams. If you plan to use a calculator function on a phone, tablet or other electronic device during an exam, you must only use the calculator function. No other use of electronic devices is allowed during exams, i.e., you may not use electronic devices to access notes or any other information during exams.

Course Materials and Presentations: All course materials and presentations (e.g., instructor notes, lecture outlines, lecture slides, assignments, exams, demonstrations) are for course use only. *These materials may not be shared, posted or in any way redistributed outside of the course, either electronically or as hardcopy.* Sharing or redistribution of these materials is a violation of the GMU Honor Code.

Recording of Lectures: Lectures and demonstrations may *not* be electronically recorded in any format without prior permission of the instructor and completion of a recording agreement form. Acceptable agreement forms are the "Recording (Audio/Video) and Copies of Class Presentations Acknowledgement" form from Disability Services, or a similar form provided by the instructor. In all cases, the opinions, questions and comments of other class members may not be shared at any point with anyone else.

Attendance: Students are expected to attend class regularly. However, attendance is not strictly required except for one Observation Night. The Observation Night will be held outside of regular class time. You must fully participate in one Observation Night to receive full credit for this assignment.

Homeworks and Quizzes: Homework assignments and quizzes will be posted on Blackboard on the days listed in the course schedule. Except when specifically noted otherwise, quizzes are due at the end of the week in which they are released (i.e., at midnight on the Saturday of the week they are made available), and homework assignments are due by the start of class (4:30 pm) one week after they are issued. Quizzes must be completed within Blackboard. Homework assignments may be e-mailed or handed directly to the instructor, or sent through Blackboard if that option is enabled. Please do not leave assignments in the instructor's office mailbox.

Quizzes are time-limited. You may start the quizzes at any time during the window that each quiz is available. Once started, all quizzes must be completed within 60 minutes of when the quiz is started.

Quizzes are open book and open notes; you may use notes, books or any other information for the quizzes.

Semester Exercise: The Semester Exercise assignment is due on the date listed in the course schedule. Semester Exercises may be turned in at any time before the due date. Checking the Exercise with the instructor is permissible and recommended prior to submitting the final work.

Independent Project: The Independent Project assignment is due on the date listed in the course schedule. Independent Projects may be turned in at any time before the due date. Frequent check-ins with the instructor are permissible and highly recommended prior to submitting the final work.

Exams: Two Preliminary Exams will be taken during the regular class meeting time on the days listed in the course schedule. The Final Exam will be taken during Final Exam week on the day and time listed on the course schedule. If GMU is closed on the scheduled date of an Exam, the make-up date and time of the Exam will be announced via Blackboard and GMU e-mail.

All exams are closed book and closed notes.

Late and Missed Coursework: Reasonable accommodations will be made for late and missed coursework due to sickness, religious observance and other unavoidable schedule conflicts if the instructor is notified prior to the date the assignment/quiz is due or exam given. Unusual situations that prevent advance notice to the instructor will be handled on a case-by-case basis. In any event, assignments, quizzes and exams that are not turned in, are not made up, or remain unexcused one week after the scheduled completion date are subject to a grade of zero.

Collaboration: Students are encouraged to study together and discuss with each other the information and concepts covered in the lectures and course readings. Collaboration on homework assignments, quizzes and the Semester Exercise is permitted so long as all students in the collaboration fully participate in the discussion of all questions, do a fair share of the collaborative work, and do their own write-ups. Simple division of labor (i.e., dividing questions within the group) is not consistent with this collaboration policy and is not permitted.

Students may discuss with each other their work on their Independent Project, but each student must do their own work on their Independent Project.

Collaboration of any sort is not permitted during exams.

Grade Postings on Blackboard: All course scores will be posted on Blackboard unless otherwise requested.

Unscheduled University Closure: In the event of an unscheduled university closure or access limitation due to weather or other reasons, check Blackboard and your GMU e-mail for any class announcements. If class cannot meet because of the closure or access limitations, supplementary activities may be assigned.

Extended Emergency Adaptation: All classes are scheduled to be conducted in-person. If an extended emergency situation prevents in-person classes, classes may be shifted to a synchronous online mode (i.e., live online) and conducted through Blackboard. You will be told if classes are being shifted to online mode and given instructions on how to access the online system.

### **University Policies**

The University Catalog is the central resource for GMU policies affecting student, faculty and staff conduct in university academic affairs. Please see the catalog (<https://catalog.gmu.edu>) or the University Policy web site (<https://universitypolicy.gmu.edu>) for information on academic and non-academic policies not explicitly specified in the syllabus.

Common policies that affect all courses at GMU regarding Academic Standards, Accommodations for Students with Disabilities, FERPA and Use of GMU E-mail Addresses for Course Communication, and Title IX Resources and Required Reporting are listed below. These policies are also posted at <https://sternscenter.gmu.edu/home/gmu-common-course-policies/>.

Academic Standards: Academic Standards exist to promote authentic scholarship, support the institution's goal of maintaining high standards of academic excellence, and encourage continued ethical behavior of faculty and students to cultivate an educational community which values integrity and produces graduates who carry this commitment forward into professional practice.

As members of the George Mason University community, we are committed to fostering an environment of trust, respect, and scholarly excellence. Our academic standards are the foundation of this commitment, guiding our behavior and interactions within this academic community. The practices for implementing these standards adapt to modern practices, disciplinary contexts, and technological advancements. Our standards are embodied in our courses, policies, and scholarship, and are upheld in the following principles:

- **Honesty:** Providing accurate information in all academic endeavors, including communications, assignments, and examinations.
- **Acknowledgement:** Giving proper credit for all contributions to one's work. This involves the use of accurate citations and references for any ideas, words, or materials created by others in the style appropriate to the discipline. It also includes acknowledging shared authorship in group projects, co-authored pieces, and project reports.
- **Uniqueness of Work:** Ensuring that all submitted work is the result of one's own effort and is original, including free from self-plagiarism. This principle extends to written assignments, code, presentations, exams, and all other forms of academic work.

Violations of these standards — including but not limited to plagiarism, fabrication, and cheating — are taken seriously and will be addressed in accordance with university policies. The process for reporting, investigating, and adjudicating violations is outlined in the university's procedures (see <https://academicstandards.gmu.edu/>). Consequences of violations may include academic sanctions, disciplinary actions, and other measures necessary to uphold the integrity of our academic community.

The principles outlined in these academic standards reflect our collective commitment to upholding the highest standards of honesty, acknowledgement, and uniqueness of work. By adhering to these principles, we ensure the continued excellence and integrity of George Mason University's academic community.

**Student responsibility:** Students are responsible for understanding how these general expectations regarding academic standards apply to each course, assignment, or exam they participate in; students should ask their instructor for clarification on any aspect that is not clear to them.

Accommodations for Students with Disabilities: Disability Services at George Mason University is committed to upholding the letter and spirit of the laws that ensure equal treatment of people with disabilities. Under the administration of University Life, Disability Services implements and coordinates reasonable accommodations and disability-related services that afford equal access to university programs and activities. Students can begin the registration process with Disability Services at any time during their enrollment at GMU. If you are seeking accommodations, please visit <https://ds.gmu.edu/> for detailed information about the Disability Services registration process. Disability Services is located in Student Union Building I (SUB I), Suite 2500. Email: [ods@gmu.edu](mailto:ods@gmu.edu). Phone: (703) 993-2474.

**Student responsibility:** Students are responsible for registering with Disability Services and communicating about their approved accommodations with their instructor *in advance* of any relevant class meeting, assignment, or exam.

FERPA and Use of GMU Email Addresses for Course Communication: The Family Educational Rights and Privacy Act (FERPA) (see <https://www2.ed.gov/policy/gen/guid/fpco/ferpa/index.html>) governs the disclosure of education records for eligible students (see <https://registrar.gmu.edu/ferpa/>) and is an essential aspect of any course. Students must use their GMU email account to receive important University information, including communications related to this class. Instructors will not respond to

messages sent from or send messages regarding course content to a non-GMU email address.

**Student responsibility:** Students are responsible for checking their GMU email regularly for course-related information, and/or ensuring that GMU email messages are forwarded to an account they do check.

**Title IX Resources and Required Reporting:** As a part of George Mason University's commitment to providing a safe and non-discriminatory learning, living, and working environment for all members of the University community, the University does not discriminate on the basis of sex or gender in any of its education or employment programs and activities. Accordingly, all non-confidential employees, including your faculty member, have a legal requirement to report to the Title IX Coordinator, all relevant details obtained directly or indirectly about any incident of Prohibited Conduct (such as sexual harassment, sexual assault, gender-based stalking, dating/domestic violence). Upon notifying the Title IX Coordinator of possible Prohibited Conduct, the Title IX Coordinator will assess the report and determine if outreach is required. If outreach is required, the individual the report is about (the "Complainant") will receive a communication, likely in the form of an email, offering that person the option to meet with a representative of the Title IX office.

For more information about non-confidential employees, resources, and Prohibited Conduct, please see University Policy 1202: Sexual and Gender-Based Misconduct and Other Forms of Interpersonal Violence (<https://universitypolicy.gmu.edu/policies/sexual-harassment-policy/>). Questions regarding Title IX can be directed to the Title IX Coordinator via email to [TitleIX@gmu.edu](mailto:TitleIX@gmu.edu), by phone at 703-993-8730, or in person on the Fairfax campus in Aquia 373.

**Student opportunity:** If you prefer to speak to someone *confidentially*, please contact one of Mason's confidential employees in Student Support and Advocacy (SSAC), Counseling and Psychological Services (CAPS), Student Health Services (SHS), and/or the Office of the University Ombudsperson.

**Diversity and Inclusion:** Through its curriculum, programs, policies, procedures, services and resources, GMU strives to maintain a quality environment for work, study and personal growth. An emphasis upon diversity and inclusion throughout the campus community is essential to achieve these goals.

Diversity is broadly defined to include such characteristics as, but not limited to, race, color, ethnicity, national origin, religion, age, disability, gender identity and expression, pregnancy status, sex and sexual orientation. Diversity also entails different viewpoints, philosophies and perspectives. Attention to these aspects of diversity will help promote a culture of inclusion and belonging, and an environment where diverse opinions, backgrounds and practices have the opportunity to be voiced, heard and respected.

Students, instructors and staff are all expected to uphold GMU's commitment to equitable access and meaningful inclusiveness for all within the GMU community.

### **Title IX**

Title IX is a federal civil rights law that prohibits discrimination on the basis of sex under any education program or activity receiving federal funding. GMU receives federal funds in many forms and so is required to comply with Title IX.

Sexual assault and sexual harassment are forms of sex discrimination covered by Title IX. Other issues that are investigated under Title IX include stalking, intimate partner violence, gender-based harassment, sexual exploitation, complicity in the commission of any act prohibited by this policy, and retaliation for good faith reporting of any of these forms of conduct or participation in any investigation or proceeding.

For more information see <https://diversity.gmu.edu/title-ix/what-title-ix/university-title-ix-statement> and [https://www2.ed.gov/about/offices/list/ocr/docs/tix\\_dis.html](https://www2.ed.gov/about/offices/list/ocr/docs/tix_dis.html) .

## **Student Support Resources**

GMU has several support resources available to all students. Potentially useful starting points include:

- Mason email: <https://mail.gmu.edu>
- Learning Services: <https://learningservices.gmu.edu>
- Student Health Services: <https://shs.gmu.edu>
- Counseling and Psychological Services: <https://caps.gmu.edu>
- Student Support and Advocacy Center: <https://ssac.gmu.edu>
- University Career Services: <https://careers.gmu.edu>
- Office of the University Ombudsperson: <https://ombuds.gmu.edu>
- Diversity, Equity and Inclusion: <https://diversity.gmu.edu>
- Sexual Misconduct, Harassment and Discrimination resources:  
<https://diversity.gmu.edu/equity-access-services/title-ix>
- Title IX Contacts at Mason:  
<https://diversity.gmu.edu/equity-access-services/title-ix/who-can-i-speak>

Many other resources are listed under Student Life: <https://www.gmu.edu/student-life>