

DRAFT Syllabus

01:460:201:91--Earthquake and Volcanoes | | Fall 2021

Instructor: Dr. Roy W. Schlische

Dept. of Earth and Planetary Sciences

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Open virtual office hours via Zoom web conference are on days before tests (4:00 – 5:00 pm & 7:00 – 8:00 pm) and on days before homework projects are due (4:00 – 5:00 pm, 7:00 – 8:00 pm). Students may also send an email request to schedule a private Zoom web conference.



1973, Eifjell volcano, Heimaey, Iceland

Summary of Course Format

This course is fully online (“by arrangement”); thus, the class does not meet as a group at a specific time on a specific day. You have lots of flexibility in when you view the course materials and do the readings. Course materials are posted as PowerPoint files or videos of the narrated PowerPoint presentations. You will take the syllabus quiz, the weekly review quizzes, and the weekly tests using “Quizzes” within Canvas. You must complete these by the specified deadlines; you may take the syllabus quiz and the tests during a 24-hour period prior to the deadline; review quizzes will be open for at least 48 hours prior to the deadline. Review questions (without answers) are posted prior to each review quiz. Answers to all review questions are posted after the quizzes and before the tests. Test questions are not available before the test, but they will be similar to those in the review questions and scattered throughout the PowerPoint presentations. The four homework assignments have due dates and times as specified in the schedule below and in the calendar within Canvas. You can interact with your peers and the instructor by posting to a discussion board in Canvas; posts can be questions about course materials, curiosity-based questions, and current events related to course content; the instructor will answer course-material-related questions in a timely manner and curiosity-based questions as soon as possible.

Technological Requirements:

(1) Computer with (2) PowerPoint, (3) Word, (4) Adobe Acrobat Reader, and (5) an internet browser like Firefox; (6) broad-band internet connection. For virtual office hours: (7) web-conferencing software (Zoom), (8) microphone, (9) webcam (optional) or (10) smartphone (the latter is a good back-up for taking quizzes and tests, reviewing course materials, etc.; be sure to install (11) the mobile version of Canvas on your phone).

Please visit the [Rutgers Student Tech Guide](#) page for resources available to all students. If you do not have the appropriate technology for financial reasons, please email [Dean of Students](#) for assistance. If you are facing other financial hardships, please visit the [Office of Financial Aid](#).



Course Webpage:

All course materials, including the quizzes and tests, are accessible through the Canvas learning management system (<https://canvas.rutgers.edu/>). Access the course site from a computer, smartphone, or pad; be sure to download and install the Canvas app for the latter two devices.

SAS Core Curriculum Goals for Natural Sciences (NS):

By the end of the course, *STUDENTS WILL BE ABLE TO:*

- Understand and apply basic principles and concepts in earth science.

- Explain and be able to assess the relationship among assumptions, method, evidence, arguments, and theory in scientific analysis.

No prerequisites: The course is accessible to a wide range of students.

Course Learning Goals:

This course will survey basic knowledge about earthquakes and volcanic eruptions as well as how these natural processes affect human civilization. Some very general objectives, not necessarily in the order of their importance, are:

- Learn about the hazards earthquakes and volcanoes pose to human civilization, and ways we can mitigate them.
- Learn basic facts about volcanoes, earthquakes, and their connection to large-scale processes within the Earth (plate tectonics and heat convection in Earth's interior).
- Develop a basic familiarity with the modern understanding of how our planet functions.

Besides the specific objectives above, you will become familiar with the broad concepts of scientific inquiry: what constitutes knowledge, how it is acquired, how it is verified, and how it is applied.

Learning Goals for Survey Courses in the Department of Earth & Planetary Sciences

Students taking this course should develop an appreciation of critical thinking and the scientific method, including hypothesis testing. Students should recognize the importance of Earth Sciences in understanding of the physical, social, and economic resources and history of our planet. For example, we would expect that any student successfully completing our courses should be able to critically evaluate scientific issues in earth systems discussed in the popular press.

Reading & Viewing Assignments

All reading assignments are either publicly accessible web pages or documents posted on Canvas. The individual course modules will list specific reading and viewing assignments.

Assessments of Learning and Basis for Grade:

- *Weekly Tests:* 55% of grade
 - 13 tests in total
 - Drop lowest test score at end of semester
- *Homework Projects:* 24% of course grade (4 projects)
- *Review quizzes:* 20% of course grade
 - 13 quizzes in total
 - Drop lowest quiz score at end of semester
 - Review questions available prior to quiz
- *Syllabus Quiz:* 1% of course grade

Consult the Gradebook in Canvas for scores and course grades. Letter grades correspond to the following numerical values: A, 90.0 to 100; B+, 85.0 to 89.99; B, 80.00 to 84.99; C+, 75.00 to 79.99; C, 70.00 to 74.99; D, 60.00 to 69.99; F, 0 to 59.99.

Review Quiz Format & Protocols:

Each review quiz consists of 12-15 objective questions (multiple-choice, multiple answer, matching, true-false). Some quiz questions may refer to drawings, photographs, maps, etc. provided with the questions. You will use Canvas to complete the quiz. Quizzes become live at least 48 hours before the deadline. Quizzes are due by 11:59 pm EDT/EST on deadline day (Sundays for the first 11 quizzes). Once you start the quiz, you will have 15 minutes to complete the quiz (less time if started immediately before the deadline). I will drop the lowest quiz score at the end of the semester.

Review quiz questions are available in the posted PowerPoint file and a compilation Word document. You should research the answers to all quiz questions prior to starting the quiz. Receiving help from another person while

working on the review questions and during the quiz or providing help to a classmate is a breach of academic integrity.

Each question number has a bank of multiple questions. The order of the selected questions and the order of possible answers are random. Thus, each student receives a unique quiz. You will need to answer the questions in order (no going back). The quiz questions do contain the original question number from the bank of review questions. Scores become available only after the deadline has passed; answers to all review questions are posted at this time, too.

Test Format & Protocols:

Each test consists of ~15 objective questions (multiple-choice, multiple answer, matching, true-false). Many test questions will refer to drawings, photographs, maps, etc. provided with the questions. You will use Canvas to complete the quiz. Quizzes become available at 12:01 am EDT/EST on the day of the test, and are due by 11:59 pm EDT/EST (Tuesdays are test days for the first 11 tests). Once you start the test, you will have 30 minutes to complete it (less time if started after 11:29 pm). I will drop the lowest test score at the end of the semester.

You may consult any resource (including the course notes, readings, etc.) during the test, except another person. However, keep in mind that you will not have enough time to look up answers for each of the 15 questions. It is essential that you review all course materials before the test. Some students find it helpful to prepare a page of hand-written notes containing items that might be challenging to memorize.

Receiving help from another person during the test or providing help (including copying or photographing test questions) to a classmate is a breach of academic integrity.

Each question number has a bank of multiple questions. The order of the selected questions and the order of possible answers are random. Thus, each student receives a unique test. You will need to answer the questions in order (no going back). The order of the questions does not affect your ability to answer them. Do not leave any questions blank; there is no penalty for guessing; however, try to use educated guesses by eliminating choices that you are reasonably sure are incorrect. Test results will be available after the deadline, but you will not be able to view the original test. I will post a review of general test results, which will include a discussion of commonly made mistakes.

Homework Format & Protocols

Homework assignments involve a series of exercises that will help you gain additional insights on the course material. Some questions will require calculations and/or measurements that would be difficult to perform during a timed test. In some instances, you will need to write short answers to specific questions. For example, you will need to characterize a volcano (unique to you), and find its location using Google Earth.

Homework assignments are due by 11:59 pm EDT/EST on the dates indicated in the schedule / calendar. *[Note: Students may still submit late assignments, although these will receive deductions that increase exponentially with time after the deadline (-0.05% for first hour, -0.1% for second hour, etc.) up to a maximum of -25%. However, I will not accept tardy assignments after grades are released.]* Specific directions will be in the homework modules.

In the event that you are unable to connect to the Rutgers Canvas site via broadband to submit a homework assignment, you may email the files directly to me. Alternatively, you may alternatively post the file to Box and send the link(s) to the me. Do not use Google Drive or other cloud-based storage platform. If file transfer is not possible, you should photograph the homework with your smart phone and email those photos to me.

Email Protocols

Using your Rutgers email account only (to prevent your messages ending up in my junk folder), email me to set up an appointment for web-conference-based office hours. For this entirely voluntary activity, provide at least three possible days/times. I will respond to your email within 24 hours during the workweek. Requests received on Saturdays and Sundays may not receive a reply until Monday afternoon. If you have not received a reply within those time frames, feel free to gently remind me of your previous request. I generally reply to emails

between 3 pm and midnight. Be sure to include the course number (460:201) in the subject heading and include your full name and RUID# in the “signature.” You may address me as either Prof. Schlische or Dr. Schlische. Please proof-read your messages to minimize typos and grammatical errors, and do not use internet abbreviations (e.g., LOL) or emoticons. Note: I will only discuss scores and grades during private office hours.

Important Dates:

- Sept. 1: Start of semester
- Sept. 8: Last day to drop the course without a W grade.
- Sept. 9: Last day to add a course
- Sept. 10: Syllabus quiz (use this to familiarize yourself with the process for taking tests)
- Sept. 12: First of 13 weekly review quizzes is due
- Sept. 14: First of 13 weekly tests is due
- Sept. 30: First of 4 homework assignments is due.
- Oct. 25: Last day to drop the course with a W grade.

List of Topics:

Introduction to geology and the scientific method • Overview of Earth: topography, distribution of earthquakes & volcanoes, plate tectonics, Earth’s layering • Review of useful skills • Chemical bonds and minerals • Igneous settings and rocks • Melting processes and crystallization • Volcano basics • Types of volcanoes • Types of volcanic eruptions • Eruption mechanics • Volcanic settings: Divergent boundaries, oceanic hotspots, convergent boundaries, continental hotspots • Case studies: Lake Nyos, Mt. St. Helens, Mt. Pelee, Krakatau, Santorini • Volcanic hazards and risks • Lava-flow diversion attempts • Submarine volcanism • Volcanism and climate • Volcanism beyond Earth • Earthquake basics • Fault zones and tectonics • Earthquake detection • Earthquake rupture • Focal-mechanism solutions and testing plate tectonics theory • Big and small earthquakes • Earth’s interior structure revealed by earthquake waves • Earthquake hazards and risks • Tsunamis • Earthquake forecasting and prediction • Historic earthquakes • Review of big ideas in earthquakes and volcanoes

Deadlines for Graded Assignments

Syllabus quiz	Weekly Review Quizzes	Weekly Tests	Homework Projects
Friday, Sept. 10	1. Sunday, Sept. 12 2. Sunday, Sept. 19 3. Sunday, Sept. 26 4. Sunday, Oct. 3 5. Sunday, Oct. 10 6. Sunday, Oct. 17 7. Sunday, Oct. 24 8. Sunday, Oct. 31 9. Sunday, Nov. 7 10. Sunday, Nov. 14 11. Sunday, Nov. 21 12. TUESDAY, Nov. 30 13. TUESDAY, Dec. 7	1. Tuesday, Sept. 14 2. Tuesday, Sept. 21 3. Tuesday, Sept. 28 4. Tuesday, Oct. 5 5. Tuesday, Oct. 12 6. Tuesday, Oct. 19 7. Tuesday, Oct. 26 8. Tuesday, Nov. 2 9. Tuesday, Nov. 9 10. Tuesday, Nov. 16 11. Tuesday, Nov. 23 12. THURSDAY, Dec. 2 13. THURSDAY, Dec. 9	1. Thursday, Sept. 30 2. Thursday, Oct. 28 3. Thursday, Nov. 17 4. Monday, Dec. 13
1% of grade	20% of grade, drop lowest	55% of grade; drop lowest	24% of grade

How to Do Well in the Course

- If you are 1st-year student (Welcome!), spend a few minutes looking over the tutorial on how to use Canvas. You can find it in the Students tab on the Canvas home page.
- Add the most important deadlines (quizzes, tests and homework assignments) to your own calendar.
- Check the announcements and the Q&A on the discussion board regularly; set Canvas preferences to send you messages about new announcements and discussion board posts.
- Take the Syllabus Quiz by Sept. 10 to familiarize yourself with the format to be used on quizzes / tests.
- Begin your study of course materials well before the quizzes. Start with the PowerPoint presentations and lecture videos; then move on to the assigned readings and supplemental videos.
- Determine the answers for all posted review questions. Then take the review quiz. Finally, check the posted answers after the quiz deadline and before the weekly test on the material.
- If you have questions about the course material or are curious about a topic, post a question on the Discussion Board. Also, visit the group office-hours sessions, especially if you still have questions on the days before the tests will take place and the homework assignments are due.
- You have a 24-hour window to take the tests (and longer for the quizzes). Choose a time when your internet connection is consistently good, distractions at home are minimal, and you are not tired. Listening to music is helpful for some students, but do turn the TV off. Do not multitask!!
- Begin homework assignments at least a week before the deadline. Proof the materials to correct any spelling or grammatical mis-steps.
- Keep the downloaded files organized so that you can readily find material needed for homework exercises.
- Regular physical exercise and 7+ hours of sleep nightly really are good for your physical and mental health.
- Check out the info at <https://rlc.rutgers.edu/succeedonline> .

Academic Integrity Policy

Rutgers University takes academic dishonesty very seriously. By enrolling in this course, you assume responsibility for familiarizing yourself with the Academic Integrity Policy and the possible penalties (including suspension and expulsion) for violating the policy. As per the policy, all suspected violations will be reported to the Office of Student Conduct. Academic dishonesty includes (but is not limited to): cheating, plagiarism, aiding others in committing a violation or allowing others to use your work, failure to cite sources correctly, fabrication, using another person's ideas or words without attribution, re-using a previous assignment, unauthorized collaboration, and sabotaging another student's work. It also includes uploading course materials to a site like CourseHero.

Resources for students: <https://nbprovost.rutgers.edu/academic-integrity-students>

Intellectual Property

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Acknowledgments

Prof. Michael Carr, a volcanologist, initially developed this course in the 1980s as the Department expanded its offerings of general-education courses. Prof. Vadim Levin, a seismologist, took over the course after Prof. Carr's retirement. Sarah Mana developed some of the homework projects. Liran Li taught the course multiple times while getting the content moved exclusively to the Canvas platform. James Bourke developed a set of web-based readings for the earthquakes part of the course (please thank him for saving you money). I thank Aaron Waters, Dr. Lauren Adamo, Zakiya Chickwendu, and Melissa Boyd for sharing copies of their syllabi with me.

Are you considering a major or minor in Earth & Planetary Sciences or looking for another course?

The Department of Earth & Planetary Sciences offers 4 major options (Geological Sciences, Environmental Geology, Planetary Science, and General Option). We also offer a minor in Earth & Planetary Science and coordinate an interdisciplinary minor in Astrobiology. Finally, we offer numerous courses that satisfy the NS requirement.

- [Information about introductory and survey courses>>](#)
- [Information about the 4 major options>>](#)
- [Information about the 2 minor options>>](#)
- [General information for prospective students from current students and alumni>>](#)

Prof. Schlische's Biographical Sketch

I am originally from Bergen County, New Jersey, and a 1981 graduate of Wood-Ridge High School. I received a B.A. degree in Geology from Rutgers University – Newark in 1985 and attended geology field camp at the University of Nevada—Las Vegas. I earned a Ph.D. degree at Columbia University and then joined the Department of Geological Sciences at Rutgers University – New Brunswick as an assistant professor in 1990. I became an associate professor in 1996 and a professor in 2007, I served as Undergraduate Program Director for the Department of Earth & Planetary Sciences from 2018 to 2021.

I have taught numerous courses at Rutgers including Introductory Geology, Planet Earth, and Oil & Gold—The Good, The Bad, The Ugly, and Field Geology. I have mentored 30 graduate students and advised 14 undergraduates for independent study and honors research projects. I am the author of 66 scientific articles and over 100 conference presentations; these have been cited in over 5000 publications. I study faults (movement on which cause earthquakes) in the field and laboratory, where my students and I use scaled down models to simulate how the Earth's crust fractures and warps. I have stood on the equator in Ecuador; experienced volcanic activity in Yellowstone, Iceland, Hawaii, and the Galapagos; and straddled a plate boundary along the San Andreas fault in California and the Reykjanes ridge in Iceland. I once found over 25 partial and whole *Semionotus* fish fossils and have a pollen species (*Cycadopites schlischii*) named after me.

Student-Wellness Services:

Counseling, ADAP & Psychiatric Services (CAPS)

(848) 932-7884 / 17 Senior Street, New Brunswick, NJ 08901/ <http://health.rutgers.edu/medical-counseling-services/counseling/>

CAPS is a University mental health support service that includes counseling, alcohol and other drug assistance, and psychiatric services staffed by a team of professionals within Rutgers Health services to support students' efforts to succeed at Rutgers University. CAPS offers a variety of services that include: individual therapy, group therapy and workshops, crisis intervention, referral to specialists in the community, and consultation and collaboration with campus partners.

Crisis Intervention: <http://health.rutgers.edu/medical-counseling-services/counseling/crisis-intervention/>

Report a Concern: <http://health.rutgers.edu/do-something-to-help/>

Violence Prevention & Victim Assistance (VPVA)

(848) 932-1181 / 3 Bartlett Street, New Brunswick, NJ 08901 / www.vpva.rutgers.edu/

The Office for Violence Prevention and Victim Assistance provides confidential crisis intervention, counseling and advocacy for victims of sexual and relationship violence and stalking to students, staff and faculty. To reach staff during office hours when the university is open or to reach an advocate after hours, call 848-932-1181.

Disability Services

(848) 445-6800 / Lucy Stone Hall, Suite A145, Livingston Campus / <https://ods.rutgers.edu/>

Rutgers University welcomes students with disabilities into all of the University's educational programs. In order to receive consideration for reasonable accommodations, a student with a disability must contact the appropriate disability services office at the campus where you are officially enrolled, participate in an intake interview, and provide documentation: <https://ods.rutgers.edu/students/documentation-guidelines>. If the documentation supports your request for reasonable accommodations, your campus's disability services office will provide you with a Letter of Accommodations. Please share this letter with your instructors and discuss the accommodations with them as early in your courses as possible. To begin this process, please complete the Registration form on the ODS web site at: <https://ods.rutgers.edu/students/registration-form>.