

National Parks Geology

WCore SAM Explorations, Quantitative emphasis [4 credits]

**Instructor**

Dr. Tiffany Rivera
Meldrum 214

trivera@westminstercollege.edu

Class

4:00-5:50 PM TR, Meldrum 250

Office hours

11:30 AM - 3:30 PM T
or by appointment

Text

*Geology of National Parks (Harris, Tuttle,
& Tuttle)*

Materials

Calculator, ruler, colored pencils,
PENCIL, and eraser

COURSE DESCRIPTION

Many of America's National Parks were designated because of their geologic beauty and history. This course will examine geologic principles and concepts through the lens of National Park Service units, as they offer represent the most exquisite examples of geologic phenomena. Geology within national parks tells a story of the evolution of North America, from mountain building, to volcanism, to historic inland seas and giant beasts of an earlier geologic age.

STUDENT LEARNING OUTCOMES

- Identify major materials that comprise the Earth and describe their origins and significance
- Understand and explain the major internal and surficial processes that act upon the Earth
- Infer the action of past geological processes from maps, outcrops, and other data sources
- Understand the large-scale history of the Earth and the evidentiary basis that allows geologists to know that history
- Understand the specific geologic history of Utah and the southwestern United States
- Understand and explain the interactions between geologic processes and human activity

This syllabus is a general outline of the course. I reserve the right to add or omit topics, or change the schedule as I see fit.

GRADING

The basis for final grades in this course is summarized in the table below. All materials to be turned in should be either clearly written (or typed). If I can't read it, I can't grade it! Late assignments will not be accepted without prior approval and will receive a "0". Extensions/make-ups for assignments/quizzes/exams will not be granted unless there is a documented emergency or unless we have made prior arrangements.

Percent of final grade

| | |
|-------------------------------------|------|
| Quizzes, exercises, homework, exams | 100% |
|-------------------------------------|------|

Types of assignments

Pre-class assignments may include chapter reading guides, online quizzes, videos

In-class assignments will consist of group work. You will need to bring your computer with you daily!

Grading scale

| | |
|----|--------|
| A | ≥ 95% |
| A- | 94-90% |
| B+ | 89-87% |
| B | 86-84% |
| B- | 83-80% |
| C+ | 79-77% |
| C | 76-74% |
| C- | 73-70% |
| D+ | 69-67% |
| D | 66-64% |
| D- | 63-60% |
| F | < 60% |

ATTENDANCE

Regular attendance is the student's responsibility. I will evaluate attendance in terms of the course requirements and take reasonable action (e.g., in-class quizzes). If you miss a class, it is your responsibility to fill yourself in on the missed material. Missed in-class quizzes can not be made up for credit and will result in an automatic zero.

WORKLOAD

The average student can expect to spend 4-6 hours per week preparing for class. This will include reading the assigned chapters prior to lecture, completing homework assignments, and any other activities that may not get completed during class.

ACADEMIC HONESTY

All work submitted by a student must represent his/her own ideas, concepts, and understanding. All material found during research must be correctly documented to avoid plagiarism. Cheating or plagiarism in any form is unacceptable; violations may result in disciplinary action ranging from failure of the assignment to failure of the course. Repeated acts of academic dishonesty may have more severe institutional ramifications. Violations will be reported to the Dean of Students office. With the exception of group work, all work must be completed independently. Refer to the Academic Catalogue or the Student Handbook for the College's statement of academic honesty.

SYLLABUS ADDENDUM

Please refer to the addendum (posted in Canvas) for information of specific Science and Math, Quantitative, and College-Wide

learning goals, as well as policies regarding discrimination or students with disabilities.

EMAIL

It is the student's responsibility to check their Westminster College email account. I will communicate with you in one of two ways. 1) Message to the entire class will be sent as a Canvas announcement. Ensure that these come to your inbox. 2) Messages to an individual student will be sent to username @ westminstercollege.edu. If you do not want to log in to this account, I advise that you set up mail forwarding.

CANVAS

I use Canvas religiously. Your assignments will be posted there with due dates. It is your responsibility to use Canvas to its fullest. I like the "calendar view" best.

RESPECT EVERYONE (yourself, your peers, and your instructor).

LISTEN AND CONTRIBUTE

Lecture and discussion can quickly morph into boring, dull, lectures if you are not an active and contributing participant in class.

INTEGRATE

This course is part of a research project designed to evaluate specific teaching materials within the geosciences. As such, we will be completing three modules this semester that address the connection between geology and society. In addition to the in-class materials, there will be several assessments and surveys that you agree to participate in. You will need to use your student ID number to complete the assessments, which helps to keep you anonymous in the grading process. You may choose to opt out of this research project, in which case your answers will not be sent to the research team at Carleton College. However, this does not mean that you get out of completing the work! If you wish to opt out, please see me. The modules and their description that we will be using are described below.

THIS IS YOUR SPACE

This room is available to you when classes are not in session. Feel free to utilizing this space to study, hang out, or meet other geology students. You'll often find upper-class students in here in the evenings. Additionally, when you come to class, commit yourself to learning! Take care of personal needs before or after class.

CELL PHONES & OTHER DEVICES

Put them away unless we are using them for a specific activity. You will receive one warning about inappropriate use of devices before I confiscate it from you. The second confiscation will result in a report to the Dean of Students regarding violation of the student code of conduct.

WILL YOU BE AWAY?

If you plan to be away (e.g., athletics, theater, etc.), you must bring me a list of dates that you will not be in class due to these events **no later than September 7.**

Human's dependence on mineral resources

Despite humans' heavy reliance on Earth's mineral resources, few think about where the products they use come from and what it took to produce them. This module addresses that disconnect by combining learning about rocks and minerals (and how these become the products students use), methods of mineral resource discovery and extraction, and the impact of mineral resource use. This module allows important geoscience concepts to be taught in the context of important and immediate societal issues while also asking students to confront human issues such as environmental justice, economics, personal choice, and politics that may arise due to obtaining, beneficiating, transporting, trading, using, and disposing of natural resources.

Living on the edge: building resilient societies on active plate margins

This module is divided into three units that focus on geologic hazards and associated risks at representative plate boundary settings: transform, divergent, and convergent. Each plate boundary unit includes: a) accounts of historically important earthquakes and/or volcanic eruptions that have occurred in that setting, b) exploration and interpretation of scientific data related to the geologic processes responsible for the geologic hazard(s), c) analysis of the effects on and risks to human populations, and d) development of strategies to mitigate risk. At the end of each unit, learning is assessed by application of content to a new location in a similar plate boundary setting.

Map your hazards! Assessing hazards, vulnerability, and risk

This module provides students an interactive mechanism to engage in place-based exploration of natural hazards, social vulnerability, risk and the factors that shape their community's perception of natural hazards and risk. The module is interdisciplinary in nature as it allows students to integrate geoscience and social science methodologies to understand societal impacts that result from natural hazards. Students will (1) identify and apply credible geologic and social science datasets to identify hazards and social vulnerability within their region, (2) collect and evaluate survey data on the knowledge, risk perception and preparedness within their social networks, and (3) make recommendations, based on the findings of their work, to potential stakeholders for continued development of a prepared, resilient community.

A few final words. I know life is hard, and college can be a real challenge. I get it – I work a bajillion hours a week too. But, listen, I'm here to help you be successful at learning. Here are things that I expect and things that I won't put up with.

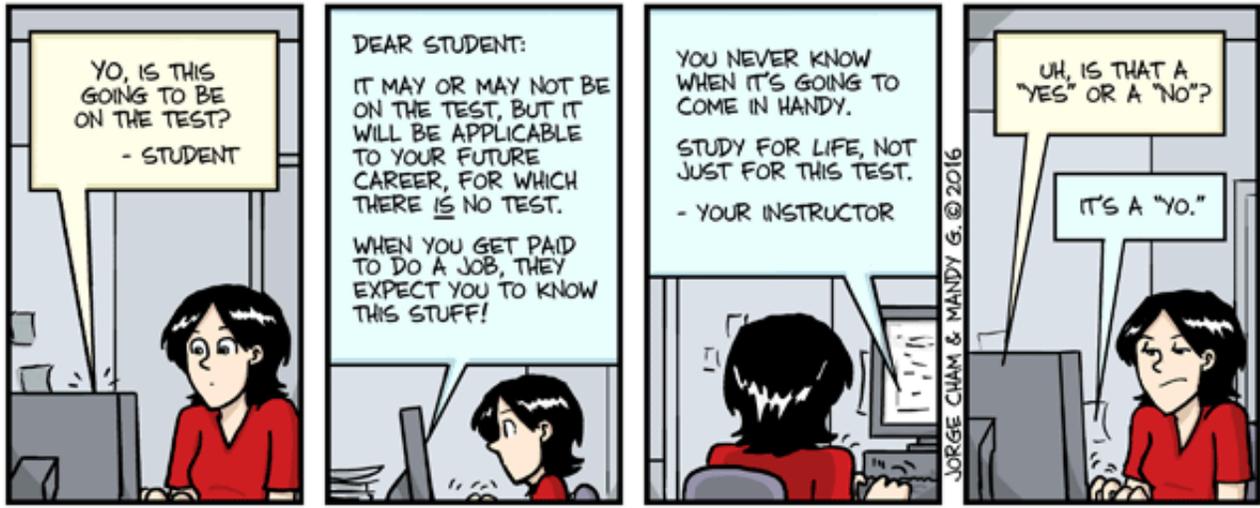
- Be on time, ready to work, and ready to THINK at the appropriate time. Don't walk in when the class starts. Don't make it a habit of being late.
- No late assignments. No make up assignments. No extra credit. Turn in your own work. Do not copy from the internet, each other, or your book. I do not deal kindly with cheating - of any kind. I have no respect or sympathy for students that disregard this warning.
- Do your own work.
- I don't give out my slides, so don't ask for them.
- When in doubt, check the syllabus. If the information you want isn't there, check Canvas. Chances are you can find the answers you need without emailing me.
- If you have questions, ASK! We are here to help you.

COURSE SCHEDULE

| WEEK | TOPIC | READING |
|------------------------|---|--|
| 1 (Aug. 22) | T: NO CLASS R: Intro to geology & geologic time | P. 1-6 & handouts |
| 2 (Aug. 29) | T: Geologic time & minerals [MR unit 1] R: Grand Canyon & sedimentary rocks | Handouts Chapter 1 |
| 3 (Sept. 5) | T: Zion & Bryce; geologic maps; [MR unit 2] R: Canyonlands & Arches [MR units 3 & 4] | Chapters 2 & 3 Chapters 5 & 6 |
| 4 (Sept. 12) | T: Grand Staircase & Topo maps R: Mammoth Cave & EXAM 1 (sedimentary rocks/minerals) | Handouts P. 187-190, Chapter 14 |
| 5 (Sept. 19) | T: Interior structure of the Earth & igneous rocks R: Mount Rainier & Crater Lake [LE units 5 & 6] | Handouts P. 505-510, Chapters 35 & 36 |
| 6 (Sept. 26) | GSA (NO CLASS; FIELD TRIP) R: Katmai & Hawaii Volcanoes; Topo maps | Chapters 38 & 40 |
| 7 (Oct. 3) | T: Seafloor spreading & paleomagnetism R: Sunset Crater, Craters of the Moon, Capulin [LE unit 3] | Handouts |
| 8 (Oct. 10) | T: Yosemite and the Sierra Nevada [LE unit 4] R: Yellowstone [MR Unit 5] | Chapter 28 Chapter 43 |
| 9 (Oct. 17) | FALL BREAK! | |
| 10 (Oct. 24) | T: Mammoth & Timpanogos Caves R: EXAM 2 (igneous rocks) | |
| 11 (Oct. 31) | T: Metamorphic rocks (Black Canyon of the Gunnison) R: Grand Teton & earthquakes | P. 643-646 & Chapter 44 |
| 12 (Nov. 7) | T: Great Smoky, Shenandoah, & the A.T. R: Glacier | Chapters 54 & 55 Chapter 26 |
| 13 (Nov. 14) | T: Death Valley [LE 1&2] R: Glacial Features (Yosemite, Glacier, & others) | Chapter 48 Chapter 19 |
| 14 (Nov. 21) | T: Utah geology R: NO CLASS | To Be Determined |
| 15 (Nov. 28) | T: Earth history R: Extinctions | |
| 16 (Dec. 5) | T: Map your hazards R: Map your hazards | |
| 17 (Dec. 12) | T: Map your hazards R: Final Exam | |

Piled Higher and Deeper by Jorge Cham

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