SEMESTER AT SEA COURSE SYLLABUS
University of Virginia, Academic Sponsor

Voyage: Fall 2015
Discipline: Environmental Science
EVSC 2800: Fundamentals of Geology
Class Time: A days 8:00 A.M. to 9:15 A.M. .
Division: Lower
Faculty Name: Alan Goldin
Credit Hours: 3; Contact Hours: 38

Pre-requisites: High school chemistry preferred

COURSE DESCRIPTION: Introduces the major concepts in the field of geology. Topics to be covered include rock and mineral identification, map reading, theory of plate tectonics, surface and subsurface hydrology, landform, geologic hazards, and environmental issues.

COURSE OBJECTIVES: The primary purposes of this course are to provide students with an understanding of geologic principles and processes. The following five objectives support these purposes:

1. Competency in terrain analysis, particularly with respect to topographic quadrangle maps, geologic and/or stratigraphic maps, and other thematic maps.

2. Competency in rock formation processes and identification.

3. Understanding the importance of long periods of time ("geologic time") on formation events and what has occurred during "geologic time."

4. Familiarization with the relationships among weathering, soils, and landform development.

5. Familiarization with plate tectonics, diastrophism and volcanism and their varied actions and surface and subsurface configurations.

REQUIRED TEXTBOOKS (*)

AUTHOR:	Stephen Marshak (M)
TITLE:	*Earth: Portrait of a Planet*
PUBLISHER:	W.W. Norton & Co
ISBN #:	039393750X
DATE/EDITION:	2015, Fifth Edition

AUTHOR:	Jack Repcheck (R)
TITLE:	*The Man Who Found Time: James Hutton and the Discovery of Earth's Antiquity*
PUBLISHER:	Perseus Publishing
ISBN #:	0-7382-0692-X
DATE/EDITION:	2003

AUTHOR:	Walter Alvarez (A)
TITLE:	*The Mountains of Saint Francis: Discovering the Geologic Events That Shaped Our*

	Earth
PUBLISHER:	W.W. Norton & Co.
ISBN #:	039306185X
DATE/EDITION:	2008
AUTHOR:	Walter Alvarez and Carl Zimmer (Z)
TITLE:	*T. Rex and the Crater of Doom*
PUBLISHER:	W.W. Norton & Co.
ISBN #:	0691169667
DATE/EDITION:	2015

TOPICAL OUTLINE OF COURSE

Class	Topic	Questions to Be Addressed	Reading *
A1-3	Formation of the Universe and Earth	How and when did the universe and Earth form?	M: Ch 1, 2 p.350-361; D&D ch 1; A: parts III & IV; B:ch3; Br: 1,3,10
A4-6	Plate Tectonics, Rock Cycle	What is science? What is scientific theory? How was Plate Tectonics developed as a scientific theory? How did it unify geological thought? What are the different types of rocks and how do they form and relate to each other and Plate Tectonics?	M: ch 3,4 Br:12
A7-8	Minerals, Chemistry	How do minerals form from magma? How is formation affected by the temperature of the magma? How are minerals identified and classified? What is the composition of various minerals and how does this depend on magmatic conditions?	M: ch 5
A9-11	Igneous rocks	How do the igneous rocks form from magma? How does temperature and speed of cooling affect the type of igneous rock? Where are igneous rocks found and why? How does Plate Tectonics affect the geographical distribution of igneous rocks?	M: ch 6
A12-13	Volcanoes and volcanism	How do volcanoes form? What are the different types of volcanoes and how are these related to Plate Tectonics?	M: ch 9; D&D: Ch 4,9,10; Br:15
A14	Weathering, Soils	How do rocks breakdown to produce sediments and soils?	M: Ch7
A15-17	Sedimentation and sed. rocks	How do sedimentary rocks form? What is diagenesis? What are the different types of sed. rocks and how are they classified? What causes different sedimentary rocks to form under different conditions? What are these conditions? What effects to sedimentary rocks result from changes in chemistry, biological activity, particle size, pressure, and temperature?	M: Ch7 R: start
A18-20	Metamorphism & Meta. Rocks	How do metamorphic rocks form? Why are they intermediate between igneous and sedimentary rocks? What causes foliation? How are metamorphic rocks classified and what are the conditions that cause change?	M: ch 8
A21-23	Geologic Time	Why is time so important in geology? How was the time scale developed? How do vegetation, animals, evolution, extinction figure in the development of the geologic time scale? What is importance of long periods of time ("geologic time") on formation events and what kinds of events occur	M: ch 12,13; R: finish; Br: 5 Z: entire

during “geologic time” and what on a human time scale?

FIELD ASSIGNMENTS

Field assignments make up 20% of your grade. We will be working with scientists from the University of Trinidad and Tobago as well as the Geological Society of Trinidad and Tobago to examine volcanoes (including mud volcanoes), seismological evidence, sea level analysis, do some environmental monitoring and environmental impact assessment, and look at energy issues. You will examine any visible landforms, fossils, and rocks, take soil descriptions, use topographic and geology maps, examine limestone caves and lava tubes, describe evidence of plate tectonics, faulting and mountain building, and other pertinent geologic phenomena that we see. You will be required to collect at least ten data points, each of which has a minimum of lat-long if possible, a photo, and a brief description. Five of the data points should have a lengthy, thoughtful entry (two pages or so) in your course journal analyzing what you see geographically. At least two of these points should have some research linked to it from the web or the library or from on-the-trip discussions with experts. Make sure you document your sources. Grades will be assigned based on the percentage of points collected (30% of grade), the relevance of your images (30%), the quality of your write-up of observations (30%), and your participation (10% (active participation → 10 points, moderate about 7, and on down to none for 0 points (just going along for the ride). The paper should indicate what you saw, what you learned, and what the geological significance is. We will use this trip in future class discussions and therefore information may be on exams.

METHODS OF EVALUATION

1. Four exams will be given: A6, A11, A18, and the cumulative exam on Finals Day. The three midsemester exams are 50 minutes and the final is 75 minutes. These exams will be a combination of multiple choice, problems, and essay. All exams will cover only material discussed since the previous exam, except as new material relates to previously tested material. The last exam will be cumulative and will be an open book exam taken on Finals Day. NO (repeat, No) make-up exams will be given. The lowest grade of the three mid-semester exams will be dropped. Exams will include questions from lecture, homework, map interpretation and field exercises.

2. Each of the textbook chapters has a test accessed through www.wwnorton.com. You must do one for every chapter we study (1-9, 12, 13). Each quiz should have at least 25 questions. The quizzes must be done individually. They may be done open book. Each chapter test is due two classes after the conclusion of the chapter. For instance if we finish a chapter on A6, the test is due no later than A8. If it is submitted later than 5 PM on that day, it will receive a grade of zero. No exceptions! The time is based on receipt of e-mail. These quizzes combined will count the equivalent of an exam.

3. Provide a scrapbook of 20 photos of geologic events (volcanoes, caves, earthquakes, soils, types of rocks, etc.) from newspapers, magazines, travel brochures, etc. Do not use geologic or related professional journals, such as *Scientific American*. Write a caption two to five sentences in length that explains the event and how this event could have happened based on what we learned in class. The name and date of the newspaper/magazine must be provided. Paper or internet copies of the newspaper are permitted (The *New York Times* itself or from nytimes.com). You absolutely cannot just google “volcano” and use an image of a volcano. Due date is noon on A19 November 30. Further explanation of the assignment is attached and examples will be on reserve in the library. To be sure you do not wait until the last minute, two scrapbook pages (photos with captions) will be due about three weeks before at A12 on November 7 and will count 10% of the scrapbook grade. You must include newspapers from at six of the nine port stops before the due date. You can also use some of your own photographs, but no more than one image per port.

4. Homework assignments will be done as assigned. Ten will be required and worth 20% of your grade. Failure to turn in the assignment on the due date will result in a loss of one grade from one hour until two classes late and a grade of zero if turned in more than two classes late.

5. Attendance is worth 6% of your grade and participation 4%. If you attend 22-24 classes, you will receive all six attendance points, 20-21 is five points, 18-19 is four points, 16-17 is three points. If you attend less than 16 classes, you will receive no attendance points. Each day you will be evaluated on your participation. You will receive a 3 for the day if you are actively engaged, a 2 if you have some participation and 1 if little or none and a 0 if you don't attend class. If your average score >2.5, you will receive all 4 points, 2-2.49 three points, 1.50-1.99 two points, 1.0-1.49 one point, <1.00 no points. It is also your responsibility to sign in for class each day as well as to deliver ALL assignments on time. Lateness of delivery will result in a 10-point grade loss immediately after class ends and for each 24 hours thereafter.

6. Be sure to check our web folder regularly. I will communicate with you in this fashion outside of class.

➔ **GRADE DETERMINATION**:

Four exams 11%, 11%, 16%)	38%
Chapter quizzes	10%
Scrapbook	12% (2% and 10% for the two pieces)
Shipwork assignments	10%
Field assignments	20%
Attendance (6%), participation (4%)	10%

RESERVE LIBRARY LIST (*)

AUTHOR:	Bryson, Bill (Br*)
TITLE:	A Short History of Nearly Everything
PUBLISHER:	Broadway or any other edition
ISBN #:	0307885151
DATE/EDITION:	2010 – any edition
COST:	**$20**

AUTHOR:	Decker, Robert & Barbara Decker
TITLE:	Volcanoes
PUBLISHER:	W.H. Freeman and Company
ISBN #:	0716789299
DATE/EDITION:	2005 – fourth edition
COST:	**$55**

AUTHOR:	Hsu, Kenneth J.
TITLE:	The Mediterranean Was a Desert
PUBLISHER:	Princeton University Press
ISBN #:	0691024065
DATE/EDITION:	1987

ELECTRONIC COURSE MATERIALS

AUTHOR:	Winchester, Simon
JOURNAL/BOOK TITLE:	Krakatoa: The Day the World Exploded August 27, 1883
VOLUME:	Harper Perennial
DATE:	2005
ISBN	0060838590
PAGES:	Chapter 3

ADDITIONAL RESOURCES: Films

Amazing Earth
In the Path of a Killer Volcano
Krakatoa
The Day the Mesozoic Died

HONOR CODE

Semester at Sea students enroll in an academic program administered by the University of Virginia, and thus bind themselves to the University's honor code. The code prohibits all acts of lying, cheating, and stealing. Please consult the Voyager's Handbook for further explanation of what constitutes an honor offense.

Each written assignment for this course must be pledged by the student as follows: "On my honor as a student, I pledge that I have neither given nor received aid on this assignment." The pledge must be signed, or, in the case of an electronic file, signed "[signed]."

Geology Scrapbook Assignment

Scrapbook Items: Over the course of the semester collect news articles, postcards, photos, travel brochures, advertisements and other images that illustrate one aspect or another of geology as indicated in our textbook. You cannot use textbooks and other prepared curriculum material, including those found on government or university web sites. Also off-limits are geology and other scientific literature, such as *Scientific American, National Geographic,* and *Discover.* Electronic images are not permitted unless they are in a news article or a personal photo.

Caption: Each item must have a caption that contains the following: 1) geology content information (pretend you are explaining what the item depicts to a friend who knows no geology, 2) information about the source of the item. To determine the content, ask yourself, "What do I see?" When You answer the question, brainstorm what you have learned about that formation or object. A newspaper article may have a caption, but it won't be geologically based. For example, they may show earthquakes damage in Turkey, but they won't tell you about Turkey's location relative to a plate boundary and what tectonic processes probably caused the quake. An article may focus on the plants or animals in a swamp, but it won't discuss the geologic sedimentary environment and what type of rock will form there and why.

Organization and Binding:
The scrapbook must be organized into sections by type, even if there is only one item in a topic. Each caption must be numbered to facilitate my counting. You may put your captions on the items or separately, but if the latter, both caption and item must be numbered. You can use a scrapbook, composition book, loose-leaf binder, or any other binding system that you like. There must be no loose items.

Grading Guide:

Criterion	A	B	C
Number of captioned items (15%)	20	17	14
Variety (20%)	at least 6 topics * 4 or more sources**	at least 5 topics * at least 3 sources **	at least 4 topics * at least 2 sources**
Percent of content correct (25%)	90%	70%	50%
Quality of content (35%)	Geology content information unfamiliar to lay persons is applied to each item, in many cases caption includes information about geologic processes. Caption is in student's own words and it is clear that ideas have not been cribbed from item's source.	Geology content information unfamiliar to lay persons in applied to each item, in some cases caption includes information about geologic processes. Caption is in student's own words.	Two thirds of the captions include geology content unfamiliar to lay persons. Caption is in student's own words.
Professionalism of presentation (5%)	Items are neat and aesthetically presented, organized by topic, captions typed, all items are fully referenced.	Items are neat, most items are referenced, captions are typed.	Captions are legible, most items are referenced, some items missing parts of references.

* Examples of topics: igneous, metamorphic and sedimentary rocks, volcanism, soils, earthquakes, geologic time, minerals
** Examples of sources: magazine ads, travel brochures, magazine articles, newspapers, personal travel photos, postcards, national park brochures
Note well: Scrapbooks handed in late (noon on November 30 (A19) or after) will lose one grade for each day late. Scrapbooks that don't meet the criteria for a grade of "C" will be given a grade of "F."
"In progress" scrapbooks handed in before A19 will be provided feedback.