

# GEOLOGY 105: Megageology

Syllabus

Lecture: M W F 0920-1010

Olin Room 103

## Course Description

A course tracing the history of the Earth from the origin of the solar system to the present. Also considered are the origin and evolution of the Earth's crust and interior; plate tectonics, continental drift and mountain building; absolute age dating; the origin of the hydrosphere and atmosphere; earthquakes and volcanism. The results of recent planetary exploration are incorporated into an examination of the origin of the solar system.

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Office hours: M W 1030-1130 (my office)

M W 1330-1530 (Hieber Café...subject to change)

or, by appointment

## Learning Objectives

At the end of the course, you should be able to:

1. Write a concise history of the Earth from the formation of elements to the modern era, including development of continents and continent configurations, the evolution of life forms, and the geochemical changes in the atmosphere and ocean.
2. Diagram major geochemical components traveling between the mantle, crust, oceans, biosphere, and atmosphere.
3. Explain how sedimentary, metamorphic, and igneous rocks are formed, and be able to identify several major rock types.
4. Describe how continental and ocean plates interact at their margins.

## Required Materials

- *Earth System History*, 3<sup>rd</sup> edition, published by W.H. Freeman, authored by Stanley
- Other readings will be given to you throughout the semester.
- A few pencils/crayons/pens of different colors

## **Course structure**

This course involves a mixture of geologic history and geologic concepts: the concepts that you need to understand events in geologic history will be introduced as the course progresses. This means that we will jump around between geologic topics (from magma to evolution to volcanic emissions to marine life, etc.), but you will immediately get to apply what you learn to major geologic occurrences. As always, let me know if something doesn't make sense!

## **Assessment**

Your understanding of course material will be assessed via:

40%	Papers
30%	Exams
10%	Quizzes
10%	In-class Activities
5%	Presentation
5%	Blog posts

You will earn full credit for completing in-class activities. I will drop zeros for in-class activities, which means that you can be absent twice without directly affecting your grade. You are responsible for being in class for all quizzes, your presentation, and exams, and for turning in all other assignments on time.

Late blog posts and papers will lose 20% for the first week, and will not be accepted after that. If you know that you will be traveling (sports, interviews, family, etc.) and will miss a quiz or exam, you must let me know ahead of time so we can schedule a make-up test. Exceptions to these policies may be made in case of serious illness, injury, learning disability, or family emergency—please let me know as soon as you can if this applies.

Some in-class assignments will involve group work, and your presentation will be graded as a group. You are welcome, and encouraged, to work on blog posts and papers with classmates, though the final products should be written/calculated/drawn/etc. by you yourself.

Final exam time: Friday, December 19, 1200-1400. This will be cumulative, with emphasis on the material following the mid-term exam.

## **Additional Assistance & Resources:**

A copy of the required text is available in the Cooley Science Library reserves. You may also find it useful to read sections from introductory astronomy or climate texts—there are a number of these in the science library, and I can point you to specific texts if you have questions about a certain topic. I will assign occasional additional readings, which I'll upload to Moodle.

If you are interested in improving your writing (which you should be!), you can check out the Writing & Speaking Center in 208 Lathrop. Peer writing consultants can help you refine your writing by reviewing a paper's focus, development, organization, clarity, grammar, source integration, or other aspects. Peer speaking consultants can help you prepare or organize the content of an oral presentation; they can also help you improve your delivery to an audience. For more information or to make an appointment, visit <http://www.colgate.edu/writingcenter> or call (315) 228-6085.

If you have any specific learning needs that could influence your course experience, and for which you would like accommodation, please let me know by September 12. If you have questions, you can contact the very nice Lynn Waldman, who is the director of Academic Support and Disability Services (315-228-7375 or [lwaldman@mail.colgate.edu](mailto:lwaldman@mail.colgate.edu)).

**Academic Integrity:**

You have signed the Colgate University academic honor code, and are expected to uphold it. I will treat evidence of plagiarism very seriously. It is always better to turn in work late, or not at all, than to plagiarize. If you have questions, particularly about the definition of plagiarism, let me know!

**Expectations:**

We will be having many discussions and doing some group work during this course. It is therefore important that everyone is respectful of everyone else in the class. Everyone should be given a chance to participate. I will do my best to make this a comfortable learning environment for you—please let me know if something is bothering you, so I can help adjust things.

Computers and cell phones in class: using them is up to you unless it becomes distracting for other students. But, do know that studies have shown that students learn less when they try to multitask with electronics.

Readings will be assigned partially to solidify your understanding of material we cover in class, and partially to enable you to participate in class discussions and in-class activities. It is therefore very important to do the assigned readings *before* class.

You should endeavor not only to learn the material, but also to learn *how to tell* if you are learning the material. This is an introductory science course and I will be teaching at a level that I hope is understandable to a wide audience. But! Some topics will probably sound intimidating. We will be talking a lot about geochemistry, evolution, tectonics, and climate- these are complex subjects and I do not expect you to master them in mere portion of a semester. If you feel confused, let me know! Email me, or come to office hours. Spend some time on Wikipedia! Talk with your classmates! You will not be able to coast along and then spend one night studying before an exam or paper due date.

**Schedule:**

Here is the general schedule of topics and assignments—it is likely to change, but the mid-term exam date will be kept the same. I will add readings to the schedule as we approach those dates. Note that the Readings are listed when they are due, not when they are assigned. Presentations will be given on the day that your group number is listed. An updated version of the syllabus will be uploaded to Moodle after any changes. I will also list the readings and assignments due in the Moodle calendar page.

Week Number	Date	Time Period	Due	Readings	Presentations Group ID
1	8/28	Course introduction			
2	9/1	The Big Bang & Star Formation & Galaxies	get Google Earth access	Scientific American: Old galaxies	
	9/3	Star Lifecycles	bring in at least one comment/question from Star Talk	Star Talk The Sun & Other Stars; Stanley 238-250	
	9/5	Solar System Formation	Quiz 1	National Geographic infographics	
3	9/8	Hadean		Stanley 1-25	
	9/10		read news/listen to podcast: questions about Mercury	Science podcast & Mercury news	
	9/12			Stanley 250-251; Elements Geochron 38-43	
4	9/15			Stanley 25-47	1
	9/17			rock id reference packet; minerals to know list	
	9/19			Stanley 174-194	
5	9/22	Plate Tectonics Interlude	Quiz 2	Stanley 195-214	
	9/24		summary of 1st article	none	
	9/26			none	
6	9/29			Stanley 251-256	2
	10/1	Archean	Quiz 3	none	
	10/3			Stanley 47-53, 59-60, 251-263	3

7	10/6		summary of 2nd article	none	
	10/8			none	
	10/10	Mid-term Exam			
8	10/13	No class			
	10/15	Proterozoic		Stanley 215-223	
	10/17		Blog response 1 due	Stanley 228-232, 263-280	4
9	10/20			Melezhik 2006	
	10/22	Early Paleozoic		None	
	10/24			Stanley 287-298	5
10	10/27		Paper 1	Peters & Gaines 2013	
	10/29			Stanley 298-301, Babcock et al. 2001	
	10/31	Middle Paleozoic		none	6
11	11/3				
	11/5	Late Paleozoic	Quiz 4		
	11/7				7
12	11/10				
	11/12	Early Mesozoic	Quiz 5		
	11/14				8
13	11/17	Cretaceous	Paper 2 Article Summary and Topic		
	11/19				
	11/21				9
14	11/24	no class			
	11/26	no class			
	11/28	no class			
15	12/1	Paleogene			
	12/3	Neogene	Quiz 6		
	12/5	Quaternary			10
16	12/8		Paper 2		
	12/10	Modern			
	12/12		Blog response 2 due		
		Final Exam			