MEGAGEOLOGY

Geology 105, Fall 2007

Course Description

A study 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; 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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We will communicate as a class by email, including any announcements or amendments in assignments and class schedule, so it is essential that you use email and **check it regularly** (~daily or every other day).

Course Objectives

You should take something away from this course at three levels. First, every inhabitant of our planet should know about its formation, evolution, and the processes that keep it running. Second, there are a number of current geologic issues that will affect the way you live the rest of your life, such as natural hazards, global warming, and the possibility of life on other planets. We'd like you to be able to assess those issues critically yourself, so that you don't have to rely on politicians, newscasters, or any other random individuals as your

primary sources. Finally, a number of you will use geology in your careers, and we'd like to provide you with solid base upon which you will continue to build in the future.

Location and Meeting Times

MWF 9:20-10:10 AM in Lathrop 404/some place in Ho later

Required Text

Selected Sections from *Horizons: Exploring the Universe* by Seeds and *Physical Geology* by Monroe and Wicander, Thomson Learning, Custom Publishing.

This text was custom assembled for us by the publisher. Notice that the page numbers are not consistent, so use the titles of the chapters to figure out which ones to read (see schedule).

Course Requirements

You will be responsible for the following assignments:

Midterm exam	20%
Final exam	25%
Participation (Class activities/short assignments)	10%
2 Reality Movie Reviews	20%
Book Presentation	25%
Total	**100%**

Grades will be assigned according to the following *approximate* scheme:

A = 90%
B = 80%
C = 70%
D = 60%

Exams

There will be one midterm exam and a final (see schedule). The exams are designed to make sure you understand the details of what we've been discussing in the course. They will be based primarily on material we've covered in class and in the textbook. They will, however, ask you to think beyond the concepts in class and apply them to new situations. Be assured that if you know the material solidly, you will always have the necessary information to answer all the questions, even if they sound unfamiliar at first.

Class Activities

We will be doing a variety of different activities in class. Sometimes there will be short assignments associated with these, either beforehand to prepare for them or afterward as follow-up investigations; some of them we'll finish during class. The sum of these assignments plus our interpretation of your participation in the course will constitute an important part of your grade.

Reality Movie Reviews: The Great Geological Film Series

You are responsible for watching TWO Hollywood movies that depict topics related to the course this semester and writing a brief **Reality Check Review**, in which you analyze the film in terms of its geological plausibility. Some details:

1) As you watch the film, make notes about events/scenery/settings (landscape, atmosphere, an activity or action, anything related to our course) that are either accurately or inaccurately presented. Before leaving the film showing, you need to hand in a copy of that list of observations to us. This is the list you'll use to write your paper, and you have to use ideas from this list only.
2) In the paper, you will focus on **three** specific issues or events (from your original list) in the film. For each issue or event, you should assess how realistic or unrealistic it was, why, and how it could be improved. You must support each of your three statements with facts from researched sources (see below), not just common knowledge. In other words, you must have looked something up and found a fact or figure or piece of information that supports your assertions about the movie events. For instance, if you state that the surface of Mars is shown to be too warm, you need to look up the average annual temperature on the Martian surface from a reliable source, explain why it's that temperature, and include the actual value and the reference for that information in the review as well as the citation where you got the information.
3) Your review should not be less than 1.5 pages (double-spaced, 12 point font, 1 inch margins) and no more than 2.5 pages long. No exceptions here, which means that you won't get full credit if it's too long, too short, or completely contorted to fit into the page limit. Follow the guidelines.
4) You must use **at least one source in addition to your textbook** to support your conclusions and opinions and list all sources used at the end of your document. Use your textbook or other library (or web-based) resources for information. Be careful with web-based sources, though. They have to be legitimate, scholarly sources, not random sites. Also, **Wikipedia is not an acceptable source.** Also take care to cite properly: *any* idea or fact you get from any source must be cited, even if it's not a direct quote (in fact you should avoid direct quotes entirely and write in your own words). Your work will be lowered by *one entire letter grade* if the source is missing and/or cited incorrectly or incompletely, so check with your friendly neighborhood librarian or us with any questions about citations. Also cite anyone who may have helped you come up with ideas. It's perfectly fine (encouraged, actually) to discuss the issues with classmates and friends, just be sure that the work we get is your own in its entirety and that you cite the people with whom you worked.
5) The review must be word-processed, proofread, and spell-checked.
6) Do not write this in 4 minutes on your way to handing it in, because it doesn't take a rocket scientist to figure out how much effort you put into your work. Have fun with it *and* do high quality work. It should be taken as an entertaining thought exercise, and a way to learn the course material better, improve your grade, and use your imagination. Let us emphasize the need to PROOFREAD your work before handing it in...nothing is more unimpressive than a sloppy document, and your grade will reflect your effort.
7) You must hand your review in via the **DIGITAL DROPBOX at our class Blackboard site**. This is accessed from http://blackboard.colgate.edu; go to our

Megageology course, go to TOOLS, and the DIGITAL DROPBOX is the first option. DO NOT send assignments by normal email, it clogs up the system and there is the risk that your assignment will be lost in the process. **The review is due no later than 5 days after the movie was shown.** For example, if the movie was shown on September 5th at 8 PM, then we must receive the review by Friday, September 9th at 8 PM. **NOTE: Late reviews will not be accepted without a valid excuse** (which means you arranged it with us at least 48 hours in advance). Feel free to include diagrams or pictures if they help your arguments but they don't count toward the paper length.

8) To get full credit you must attend the movie for its entirety and hand in a copy of your list of observations before you leave. Relying on your memory from some time in the past when you saw the movie won't work very well unless you are oddly obsessed with it, and even then it's probably not in enough detail to do a good job on the reality analysis.
9) If you submit more than two reviews (see below, under Extra Credit), the best two will count for the required ones and you'll get extra credit for the additional ones. If you simply attend the movie, there will be some extra credit

These are the films from which you have to choose 2 for the reviews. They will always be shown as part of the Colgate University Geology Society film series, exact date, time, and place to be announced in class. The week in which the movie will be shown is indicated on the syllabus. The films will be on reserve at Case Library after each showing.

1. Total Recall
2. Journey to the Center of the Earth
3. Dante's Peak
4. Day After Tomorrow

Extra Credit Opportunities

You may earn up to 100 additional extra credit points for this course throughout the term; if you get all 100 points, you will earn 5% of your final grade over and above the 100% listed above...earn 50 points and you'll get an additional 2.5%, you get the picture. Notice that an extra 5% of your final total can make a big difference in the final letter grade. Let us emphasize, however, that y*ou do not need extra credit to do well in the course*. Several opportunities for extra credit exist:

1) you will get 5 points extra credit for attending any movies (in their entirety of course) beyond the required minimum of two;

2) you will get up to 20 points extra credit for attending a movie *and* handing in a Reality Review for that film, beyond the required minimum of two (we say "up to 10 points" because obviously the quality of your review plays a role here);

3) various other extra credit opportunities may arise during the course of the term, so stay tuned. These will include attendance at relevant seminars.

Book Presentation

You will be assigned one of three books to read that is focused on the interaction between humans and the natural world: 1) *Collapse*, by Jared Diamond; 2) *When the Rivers Run Dry* by Fred Pearce; or 3) *End of Oil* by Paul Roberts. They can all be obtained either at the bookstore (upstairs, not in the textbook section) or from Amazon.com or Half.com or

Abebooks.com, where you can find them used for good prices. The group of students reading each book will be responsible for teaching *one entire class period* discussing the highlights of the books, focusing on how humans have affected the planet and vice versa. Each book group will be required to do the following:

1) 1.5-2 weeks before the scheduled class, everyone must meet with us, having read the assigned book and prepared a list of 5 of the most compelling issues raised by the book and a list of 10 questions raised by the book. During this meeting, we will discuss the book as a group and brainstorm ideas for how your group will design the class.

2) Approximately 5 days before the presentation date, the group must meet with us again, this time bringing their detailed class plan that has been worked out as a group. This should be the "script" for the class you will be teaching together, not just a list of ideas. You should also be prepared for a rehearsal with us, so that we can help you craft the most effective class possible. You are responsible for teaching the class about the issues discussed in the book, so you should think creatively, carefully, and rigorously as you plan your session. Everyone in the group should have an active role in the class period.

The most important goals of the presentation are: a) to inform the rest of the class (who have not read the books, probably) about the most compelling issues covered in the books; b) generate discussion in the class about those questions with the whole class; and c) refine your presentation skills and your ability to work in groups.

Participation and Attendance

Your participation grade is based on several different components. Atmosphere and morale in any class are affected by your participation, attendance, and attention during class time. If you are drowsy or inattentive in class, or if you are habitually or even occasionally late to or absent from class, your grade will be adversely affected:

- Students with more than three unexcused absences will be penalized by a lowering of their course grade by a full letter grade (e.g. A will become B, B+ will become C+, etc.)
- Students with egregious numbers of unexcused absences will receive an F in the course.
- Students who habitually come to class late or are drowsy or inattentive in class will be penalized by a lowering of their course grade by up to a full letter grade.

Some useful information: always handing in class assignments, contributing actively to class discussions and activities, being at every class, and participating in the Blackboard discussions (see below) are all excellent ways to guarantee you will get full participation credit. Not doing those things will pretty much guarantee you won't get full credit, and if you have a look at the grading scheme, you'll see this can have a significant effect on your final grade.

Here's another useful tidbit: if you have had a particularly rough night before class and think you will be having big problems staying awake and alert, don't hide in the back. Instead, sit near the front of the class. That way, you are letting us know that you are at least making a major effort to stay with us and be involved despite intense fatigue. As a result, you let us know you're doing your best and we give you the benefit of the doubt instead of assuming otherwise.

You may obtain an excuse for missing class by contacting us in person, by phone, or by email if you will need to be absent (that means we must respond to you; just sending email or leaving voicemail without hearing from us doesn't work). Excused absences are of two varieties:

1) Classes missed due to illness or personal calamity. You may obtain an excuse by contacting me. Supporting documentation ought to be forthcoming from either the Health Center or the Dean of Student's Office.

2) Classes missed due to athletic or conflicting academic reasons. You will need to notify us *at least 48 hours in advance*.

It is not difficult to get an excused absence for the class; all we ask is that you be courteous and let us know ahead of time for things such as sporting events, other academic conflicts, family visits, and so forth. You must contact us at least 48 hours in advance for a valid excused absence (email, voicemail, or in person); if there is an emergency, simply contact us as soon as you can, within reason. Deal with the problem first, don't worry about getting in touch with us until things have cleared up.

We expect you to be prepared for class each and every time we meet. This means carefully doing the readings assigned for that week. You should have finished the week's assigned readings by Wednesday of each week, but should be part way through it on Monday. Occasionally we will ask you to do work in class that relates to the readings, so it is critical that you keep up to date. This doesn't mean you should remember every single detail from the text; you should focus on the big picture. Please bring any questions that come up during your readings to class for us to discuss, anytime.

We also expect you to be alert and enthusiastic during class, and to contribute to class discussions. Oftentimes we'll work in small groups, where we expect you to be an active participant.

Collaboration and Academic Honesty

We expect 100% academic honesty from each and every one of you. Don't cheat, don't make up information or sources, don't plagiarize, don't lift anything from books of websites no matter how apparently trivial, always cite sources for everything (that includes ideas, concepts, images, drawings…not just direct quotes) and don't help anyone do any of the above. We have *absolutely* no patience for anyone who cheats in classes in any way. Everything you hand in must be your own, original work; if someone helps you with your work, with proofreading, with ideas, then you *must* acknowledge them. We encourage you to work with other people, to bounce ideas off each other, to brainstorm, to read each other's work; all you have to do is acknowledge that person in the work you turn in. We expect you to adhere to the Honor Code and its spirit in its entirety. If you are unfamiliar with the concepts of the Honor Code, or plagiarism, or academic dishonesty, we encourage you to read the details in the Student Handbook (1999-2001), pages 74-77. We take this very seriously and expect you to do the same. If you have any questions do not hesitate to discuss them with us immediately.

Otherwise, we encourage you to work with other class members on assignments, reading, reality reviews, and the book presentations. Science is about communication and brainstorming, don't hesitate to get others involved in your work. The only constraint, and this is a serious one, is that the work you hand in **is entirely your own**. If you had help or contributions of any kind from other individuals, you must cite their contributions in a list of

sources (just list their name, then "personal communication", and the date of the interaction).

Similarly, any sources you consult in your work must be cited in their entirety. Use any accepted referencing system for the format.

And finally, a reminder....

HOW TO DO HIGH QUALITY WORK

The grades you receive for your work depend only in part on 'getting the right answer'. In fact, in this class, there often isn't a single answer, rather a few theories or ideas that you must weigh and assess; often, we are looking at natural systems that change on a daily basis. It is also very important that you communicate what you know clearly and effectively, and so your grade will depend on the form of your work as well as its content. Heed the following, terribly simple advice: **Always do your best, highest quality work**. Never compromise.

This may seem obvious! But what does it mean? The best advice We can give you is to avoid producing work in this or any course that looks like you are just going through the motions of something without knowing why except that you were told to do it, or hastily getting something done in time, or complying grudgingly with something that you are being made to do. Craft your work well. Plan and think before you write. Make your work both complete and precise: avoid vague generalizations and, whenever appropriate, include relevant details and show your logic and rationale. Make sure your tone and language are worthy of the occasion: scholarly and professional. Find a way to get into the spirit of things that is compatible with your basic nature. There are many ways to shine. Nevertheless, excellent work LOOKS excellent -- mediocre work LOOKS mediocre. Some guidelines:

FORM: 1) Correctness. A basic issue is always the correctness of your Work: punctuation, grammar, spelling. Make sure your handwriting is neat and legible, or that wordprocessed writing has been spellchecked and proofread. If We can't read it or decipher it, how can We give you credit for it?

2) Accuracy and precision of language. A big problem many students have is the use of inaccurate and imprecise language. Avoid vague, cryptic, and colloquial language. It reflects both inadequate thought formulation and inadequate facility with vocabulary. Time and care can fix this problem.

CONTENT: 3) Focus and relevance. Did you stay on one well-defined subject or fly off on tangents? Did you have a point or did you wander and ramble, as though lost?

4) Verisimilitude. Was you interpretation of the problem or issue reasonable or did it indicate a probable misunderstanding?

5) Preparation. Did your answer reflect adequate familiarity with the material we have studied, or did it look like you hadn't studied very much or paid attention in class?

If your work is weak in any of those ways, then it is hard to think of it as more than fair to mediocre in quality, and to give you more than about a C.

SOME QUALITIES OF EXCELLENCE: To get an honest and heartfelt B or higher for your work, it needs in addition to display at least some of the following qualities:

1) A sense of mission. Did you get the point of the exercise or the question? Or did you seem confused?

2) Deftness. Was the tail wagging the dog, or vise versa? Did you seem as if you didn't have a clue about what you were doing or why, or did you have things under control?

3) Insight. Did you see deeply into the issue? Did you have an original thought about it?

4) Awareness of context and significance. Did you indicate when and how the problem called for a larger understanding of the material as well as the various contexts in which it could be usefully viewed?

5) Subtlety. Did you seem to appreciate the depth and complexity of the issue? Or were your thoughts facile, superficial, poorly formulated, hasty, incomplete, etc.?

Tentative Schedule for Geology 105
MEGAGEOLOGY

Week	Date	Topic	Reading	Other Events
I	Aug. 27-31	*The Setting*: The Big Bang and Galaxy Formation	1. Scale of the Cosmos 2. Cosmology	
II	Sep. 3-7	*Raw Materials*: Synthesis of Elements in Stars	1. Atoms and Starlight 2. The Sun, Our Star *3. Formation and Structure of Stars* 4. The Deaths of Stars	
III	Sep. 10-14	*Heavy Construction:* Formation of the Planets	1. Origin of the Solar System 2. Earthlike Planets	*Movie 1: Total Recall*
IV	Sep. 17-21	*Interior Modifications*: Early Differentiation of the Earth	1. Worlds of the Outer Solar System	
V	Sep. 24-28	*The Schedule*: Timing of Formation Events	*Geologic Time: p228-233*	
VI	Oct. 1-5	Plate Tectonics	1. The Seafloor 2. Plate Tectonics: A Unifying Theory	*Movie 2: Journey to the Center of the Earth*
VII	Oct. 8-12	Plate Tectonics	1. Earthquakes 2. Deformation, Mountain Building, Evolution of the Continents	
	Wed. Oct. 10	**Midterm Exam**	**7-9 PM**	
VIII	Oct. 15-19 Fall break	*No class Monday* Volcanoes	1. Volcanism	
IX	Oct. 22-26	Volcanoes Gradation	1. Igneous Rocks 2. Sedimentary Rocks	*Movie 3: Dante's Peak*
X	Oct. 29- Nov. 2	Geomorphology	TBA	

XI	Nov 5-9	Surface Processes Climate	TBA	
XII	Nov 12-16	*Making the Planet Comfortable:* Climate **Class dinner at Merrill House Wednesday, Nov. 14, time TBA.**	TBA	BOOK CLASS: *When the Rivers Run Dry*
XIII	Nov. 19	Climate Thanksgiving break: No class Wednesday, Friday	*IPCC F.A.R.* Summary for Policymakers	
XIV	Nov. 26-30	Geologic Time	*1. Geologic Time*	*Movie 4: Day After Tomorrow* BOOK CLASS: *End of Oil*
XV	Dec. 3-7	*So...are we alone?:* Evolution and Life		BOOK CLASS: *Collapse*
	Finals Week	Final Exam: 9-11 AM Tuesday, Dec. 11		

All readings are from the custom text available at the Colgate bookstore. Match the title of the chapter to the assignment in the READING column, and read that entire chapter when it's assigned.

DON'T FORGET: TO GET CREDIT, A REALITY MOVIE REVIEW MUST BE HANDED IN WITHIN 5 DAYS OF THE SHOWING OF THAT FILM.