

**EARS 2 Evolution of Earth and Life**  
Winter 2014

**Professor:** Erich Osterberg, 205 Fairchild Hall, 646-1096, Erich.C.Osterberg@dartmouth.edu

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**Class Meeting Time:** Mon Wed Fri 11:15 am - 12:20 pm.      **X-hour:** Tues. 12:00-12:50 pm.

**Office Hours:** Check Blackboard for updated office hours and locations

**Class Web Site:** <http://blackboard.dartmouth.edu>

**Course objectives:**

The presence of life on Earth potentially makes it unique in this solar system. The reasons that life emerged, persisted, and evolved on Earth are tied to Earth's geochemical and geophysical processes, such as the rock cycle and carbon cycle, which have been active on Earth since its formation 4.54 billion years ago. This course examines how the evolution of the continents, oceans and atmosphere has strongly influenced the evolution of life, and vice-versa, for most of Earth's history, including today. In this context we will discuss the origin of the Earth, Moon, oceans, continents, atmosphere, biosphere, and the importance of catastrophic events in the destruction and evolution of species.

By the end of this course, you should be able to:

- 1) *synthesize the evolution of the Earth and life on Earth, including the major events in the history of each, and their impact on one another;*
- 2) *critically evaluate scientific information (e.g. reported in the media) based on knowledge of the scientific method and scientific uncertainty;*
- 3) *use scientific data to make educated, quantitative estimates of complex systems.*

**Prerequisites:**

There are no prerequisites for this course.

**Texts:**

- 1) ***Earth System History, 3rd Edition***, by Steven M. Stanley (the 2nd edition is ok but page numbers and some content may differ). This book is on reserve in the Kresge Science Library, 3rd floor Fairchild Hall.
- 2) ***Out of Thin Air***, by Peter Ward. This book is also on reserve in the Kresge Science Library.
- 3) ***Life on a Young Planet***, by Andrew Knoll. This book is also on reserve in the Kresge Science Library.

## Course Requirements and Grading:

**Quizzes (10% of grade):** There will be 3 announced quizzes during the term on the reading and lectures. This is to help you prepare for the exams by testing your knowledge and giving you incentive to keep up with the reading. **I will drop the lowest quiz grade.**

**Homework Assignments (30% of grade):** There will be five homework assignments throughout the term. You will have at least 1 week to complete each assignment.

**Class participation (10% of grade):** This will be calculated solely based on the number of in-class exercises you complete. **Each student may miss up to 3 classes without it negatively affecting their grade.** These could be for any reason – illness, sports or performance conflict, family commitment, job interviews, etc. There is **no need** to contact me about absences unless there are special circumstances (extended absences). Students who attend all classes, or miss only 1 or 2, will receive **PRORTIONAL EXTRA CREDIT** for their class participation grade.

**First Midterm Exam (15% of grade):** 60 min during class on **Wednesday, January 29** from 11:15-12:20 pm, covers material from the beginning of the course up through and including the Friday 1/24 material.

**Second Midterm Exam (15% of grade):** 50 min during **X-Hour** on **Tuesday, February 18** from 12-12:50 pm, includes material covered from 1/27 through 2/14, inclusive.

**Final Exam (20% of grade):** 2 hr exam at **8:00 am on Monday March 11 in the Lecture Hall.** This is a **cumulative** final exam covering the entire term.

Letter grades will be assigned to your cumulative total points according to the following:

A ≥ 95.00 > A- ≥ 90.00 > B+ ≥ 85.00 > B ≥ 80.00 > B- ≥ 75.00 > C+ ≥ 70.00 > C ≥ 65.00 etc.

I must adhere to these cutoffs to be fair to all students. If you have a cumulative weighted grade of 89.99% at the end of the term, then you will get a B+.

**Grading Questions and Corrections:** Despite our best efforts, grading errors are likely with 150+ students in the class. Please review all of your homework, quiz, and exam grades for errors and inconsistencies, and ask the TAs or me any questions within **1 week** after each is returned. I will not review grades after 1 week unless there are extenuating circumstances.

**Unexpectedly Missing Quizzes and Exams:** If you have to miss a quiz or exam, **YOU MUST CONTACT ME BEFORE THE QUIZ OR EXAM STARTS** to explain your absence and make plans for taking the exam/quiz at the next available time. Email ([erich.c.osterberg@dartmouth.edu](mailto:erich.c.osterberg@dartmouth.edu)) and telephone (603-646-1096) are ways to contact me. If I do not answer the phone, **leave a message!** You may be expected to provide a letter from your doctor, dean, family member (etc.) explaining that your absence was justified.

**\*\*\*FAILURE TO CONTACT ME BEFORE THE EXAM/QUIZ OR FAILURE TO PROVIDE A VALID REASON FOR YOUR ABSENCE MAY RESULT IN YOU RECEIVING A 0% ON THE EXAM OR QUIZ\*\*\***

**NO make-up exams/quizzes will be available without a valid reason for absence.**

**Planned Absences during Quizzes or Exams:** If you know ahead of time that you will be absent from a quiz or exam (e.g. for a college-affiliated extra-curricular activity, job interview, etc.), speak with me about it **as soon as you know** so that accommodations can be

made. In general, my policy is to allow students to take exams and quizzes **early** for a planned absence, but not to take it late unless there are special circumstances.

**Late Homework Assignments:** Homework assignments are **due at 5 pm** on the due date. You should turn in your assignments in the EARS 2 drop box on the second floor of Fairchild Hall. 5% will be deducted for each day that an assignment is late, unless you discuss the situation with me **prior** to the original due date. For example, an assignment due on Wednesday would be deducted 5% if turned in between 5 pm Wednesday and 5 pm Thursday, and 10% if turned in between 5 pm Thursday and 5 pm Friday, etc. If you are unable to complete an assignment on time due to illness or other personal reasons, you may be eligible to have this penalty waived. You are encouraged to talk to me **as soon as possible**, and if necessary, meet with your Dean to discuss your situation.

**Disability-Related Accommodations:** Students with disabilities enrolled in this course and who may need disability-related academic adjustments and services are encouraged to see me privately as early as possible in the term. Students requiring disability-related academic adjustments and services must consult the Student Accessibility Services office (301 Collis Student Center, 646-9900, [student.accessibility.services@dartmouth.edu](mailto:student.accessibility.services@dartmouth.edu)). Once SAS has authorized services, students must show the originally signed SAS Services and Consent Form and/or a letter on SAS letterhead to me. As a first step, if students have questions about whether they qualify to receive academic adjustments and services, they should contact the SAS office. All inquiries and discussions will remain confidential.

**Religious Observances:** If you have a religious observance that conflicts with your participation in this course, please meet with me **as early as possible** to discuss accommodations.

**Academic Honor Principle:** You should be aware of and conform to the Dartmouth Honor Code as expressed in the ORC. Any suspected Honor Principle Violations will be reported to the Dartmouth Committee on Standards (COS). For this course, be aware of the following:

- **Quizzes and Exams:** All work on quizzes and exams is your own.
- **Homeworks:** You are encouraged to discuss homework assignments in groups, but what you turn in must be written in your own words.
- **In-class assignments:** Taking credit for an in-class exercise when not attending that lecture, or posing as another student for an in-class exercise, are both Honor Principle Violations and will be reported.
- **Plagiarism:** Be sure to cite all references in homework assignments.
- If you are unsure, please ask a TA or me how the Honor Principle applies to this course.

### Tentative Course Schedule (Updated 12/29/13)

<b>Date</b>	<b>Lecture Topic</b>	<b>Reading (S=Stanley; K=Knoll, W=Ward)</b>
1/6 (M)	Intro and overview of the course	S ch 1
1/7 (W)	Rocks and minerals I	S ch 2
1/10 (F)	Rocks and minerals II	S ch 2
1/13 (M)	Diversity and classification of life	S ch 3; K ch 1-2;
1/14 (Tu)	X-Hour: Optional homework #1 field discussion: meet at Bartlett Tower	
1/15 (W)	Earth's environments	S ch 4; <b>HW #1 due</b>
1/17 (F)	Sediment environments	S ch 5
1/20 (M)	<b>No Class</b> – MLK Jr. day; Class moved to 1/21 X-hour	
1/21 (Tu)	<b>X-Hour:</b> Sediment Environments II	S ch 5; K ch 3
1/22 (W)	<b>Quiz #1 (thru 1/21 material);</b> Evolution and the rock record I	S ch 7;
1/24 (F)	Evolution and the rock record II	S ch 7; <b>HW #2 due</b>
1/27 (M)	Dating the rock record	S ch 6
1/29 (W)	<b>MIDTERM EXAM #1 (thru 1/24 material)</b>	
1/31 (F)	Plate Tectonics I	S ch 8;
2/3 (M)	Plate Tectonics and mountain building I	S ch 8+9; <b>HW #3 due</b>
2/4 (Tu)	<b>X-Hour:</b> Plate Tectonics and mountain building II	S ch 8 + 9
2/5 (W)	Earth's biogeochemical cycles	S ch 10
2/7 (F)	<b>No Class</b> – Carnival!! Class moved to 2/4 X-hour	
2/10 (M)	Early Precambrian time	S ch 11; K ch 4 + 5
2/12 (W)	<b>Quiz #2 (thru 2/11 material);</b> The Proterozoic & Snowball	S ch 12; K ch 6-8
2/14 (F)	The Cambrian Explosion	S ch 13; W ch 1-3; <b>HW #4 due</b>
2/17 (M)	Ordovician extinction and land colonization	S ch 14; W ch 4 + 5
2/18 (Tu)	<b>X-Hour: MIDTERM EXAM #2 (thru 2/14 material)</b>	
2/19 (W)	Coal swamps and mass extinction	S ch 15; W ch 6 + 7
2/21 (F)	The rise of Dinosaurs	S ch 16; W ch 8 + 9
2/24 (M)	Cretaceous Dinosaur reign and impact extinction	S ch 17; W ch 10
2/26 (W)	<b>Quiz #3 (thru 2/24 material);</b> Rise of the mammals	S ch 18; W ch 10;
2/28 (F)	Rise of the mammals in the Neogene	S ch 19; <b>HW #5 due</b>
3/3 (M)	The Neogene world and climate	S ch 19
3/4 (Tu)	Human evolution and civilization	S ch 19
3/5 (W)	Holocene and modern extinctions	S ch 20
3/7 (F)	<b>Last Class:</b> Man's impact on the Earth	S ch 20
3/10 (Mon)	<b>8:00 am FINAL EXAM in Oopik Auditorium (Lecture Room)</b>	