ENVS 222—**Evolution of the Earth**
Oxford College of Emory University, Spring 2019

COURSE INFO

- Instructor: Dr. Melissa Hage, melissa.hage@emory.edu, Room OSB 224, 770-784-8345
- Lecture: Tuesday and Thursday 10:00 – 11:15 am; Room OSB 223
- Book: *The Story of Earth* by Robert Hazen
- Lab: Monday 2:00 – 5:00 pm; Room OSB 223

OFFICE HOURS

- Tuesdays 2:30 – 3:30 pm and Wednesdays 10:00 – 11:00 am
- By appointment or chance. I am usually in my office from 8:30 am – 5:00 pm, except for when I am teaching classes or attending meetings.

OVERVIEW

The Universe is a staggering 13.7 billion years old, and during its lifetime the elements necessary to build planets and life were created in stars and distributed across the galaxies. 4.6 billion years ago, our planet, and everything else in our solar system, formed, and since then, our planet has evolved from a fiery ball of magma to the cool, lush, habitable planet we live on today. The geological record is by no means complete, yet with careful observation it provides us with a means to observe the interactions between life and nature throughout Earth's long history…and we find that the history of life and the physical and chemical evolution of the Earth's environment are constantly in flux and are inextricably linked. Life on Earth originated some 4 billion years ago and has evolved in response to environmental changes on the planet. At the same time, major innovations in the history of life has led to transformations of the Earth's atmosphere, hydrosphere, geosphere, and climate. In this course, we will focus on the changing nature of these interactions through Earth history.

OVERARCHING STUDENT LEARNING OBJECTIVES

The two **overarching goals** of this course are:

> 1) to peak your curiosity about the Earth they inhabit, gain knowledge about the natural world, and to share that curiosity and knowledge with others. You should be able to observe the world around you, marvel at what you see, and understand the processes at work.
>
> 2) to impart to you a relevance of scientific knowledge and processes so that you can become more critical thinkers and better decision-makers – economically, politically, socially, and personally.

At the completion of this course, you will be able to:

- Identify common sedimentary rocks and structures, and interpret and describe the depositional environments in which they form
- Describe the sedimentological, paleoclimatic, and orogenic history of the Earth with a focus on North America
- Explain and apply the principles of stratigraphy, paleoecology, and geochronology

- Explain the theory of biological evolution and how it explains the diversity and extinction of organisms
- Identify common fossil organisms and describe their habitat
- Construct and interpret geologic and stratigraphic maps and cross-sections
- Understand how geology relates to your everyday life
- Effectively communicate scientific ideas

MAJOR THEMES

1) Deep Time and Rates of Change
2) Using the Past to Understand the Present
3) Interconnectedness of Biosphere, Geosphere, Hydrosphere and Atmosphere

GRADING AND ASSESSMENT

	%
Exams (4 x 10%)	40
Lab	25
Final Paper	10
In-Class Quizzes	8
In-Class Activities and Participation	7
Pre-Class Quizzes	5
Homework Assignments	5
Total	100

Letter Grade	Percent Equivalent
A	94-100
A-	90-93
B+	87-89
B	84-86

Letter Grade	Percent Equivalent
B-	80-83
C+	77-79
C	74-76
C-	70-73

Letter Grade	Percent Equivalent
D+	67-69
D	60-66
F	0-59

*Note: I do not curve grades. I also do not ***give*** grades. **Your final grade in this class will be based on what you have earned. If you do not pass lab, you will fail the course.**

** I am more than happy to discuss your overall grade or a grade you earned on a specific assignment. However, **I will not do so via email**. If you would like to discuss your grade, please come and see me in person during office hours or make an appointment.

COURSE POLICIES

Grading policies: Grades are assigned on a straight scale (not curved). In the case of grades near the cutoff, good attendance, class participation, and improvement over the course of the semester can have a (+) marginal effect on your final grade. Poor attendance and class participation can likewise have a (-) marginal effect. Students wishing to appeal grading on assignments must do so within 1 week of receiving the graded work.

Weekly Readings: Class periods will be spent reviewing, discussing, and illustrating concepts presented in the assigned book readings and video. This will go more smoothly if you read the assigned materials before class meets on the assigned date.

Pre-class quizzes: Lecturing about terminology is no fun for me or you! In order to introduce you to topics we will be working on in class, there will be a short Canvas quiz based upon the designated reading and/or video prior to many of the classes. These quizzes will allow us to spend class time working through more complex concepts.

- You may submit as many attempts for each pre-class quiz as you would like, and your grade on each quiz will be the average of all attempts.
- All pre-class quizzes are due by 9:30 am on class days.
- There will be no make-ups for missed quizzes, however, the lowest grade will be dropped.

In-Class Activities and Participation: You are encouraged to actively participate in class discussions in order to enhance and facilitate student dialogue and learning. I invite you to share your experiences, perspectives, questions, and analysis of text, reading materials and assignments. Please don't just to be a spectator! That being said, you are all adults and capable of making the decision about whether you chose to come to class or not. Thus, attendance will not be taken in the traditional way. There will be in-class activities designed to check for preparation and understanding, generate discussion, encourage participation, and deepen comprehension of the course material. Simply showing up to class and just sitting there will not get you full participation points for the day.

- For some of these activities, full points will be awarded for completion. For other activities, points will be awarded based on correctness. Some activities will be completed in class; other activities will need to be finished outside of class.
- There will be no make-ups for missed activities; however, the lowest 3 grades will be dropped at the end of the semester.
- There are no excused absences for lecture. The dropping of the 2 lowest activities grades act as your missing class freebies and can be used for any reason (illness, studying, travel, athletic event, family emergency, wild monkeys breaking into your dorm, etc.). Any additional missed classes will count as zeros for those days' activities.

How to Participate

- Answer and ask questions (quality over quantity)
- If you tend to be a less vocal participant in classroom discussions, send your thoughts or questions to me via email, talk to me after class, etc.
- Participation also involves "active" listening, including eye contact, nodding, smiling, raising eyebrows, taking notes, etc.
- Texting, sleeping, talking while I am talking, and being generally disruptive during class meetings will not earn you participation points.

In-class quizzes: Cooperative quizzes will be administered throughout the semester to check for content understanding and to ensure you are engaging in *distributive studying*.

- Part 1: You will independently take the quiz
- Part 2 (optional): You can re-take a similar quiz, but will work in a group (not the exact same questions, but on the same material)
- Your final score is 75% from Part 1 and 25% from Part 2.

- If you choose not to complete the group quiz or if your grade on Part 1 is higher than Part 2, only your grade from Part 1 will count. Bottom line: taking the cooperative quiz will not negatively affect your quiz grade.
- Some quizzes will be announced, others will not, and quizzes cannot be made up. I will drop the lowest quiz grade to help offset possible extenuating circumstances, such as illness or absence due to an athletic competition.
- Quizzes are administered at the start of class. Late arrivals will not be given additional time and cannot take Part 1 if Part 2 has already or is about to begin.

Late Assignments: If an assignment is due in class, it will be due at the start of class. If it is turned in at the end of class, it is considered late. Most Canvas assignments will be due at 9:30 am. Assignments will be accepted up to 1 week past the due date. Scores on late assignments will be penalized 10% each day they are late, including weekend days. So, if an assignment is due in class on a Tuesday at 10:00 am and you turn it in between Tuesday at 10:01 am and Wednesday at 10:00 am, you will lose 10%. *After 1 week, the grade becomes a zero.*

Exams: There are 4 exams. Each exam will cover the topics preceding the exam. These are not cumulative, however, keep in mind that we will be building upon prior knowledge and that you will need to utilize that knowledge on subsequent exams. There will be no make-up of exams without a legitimate excuse discussed prior to the exam and the instructor will make the final decision regarding whether or not a missed exam is acceptable. **All exam and due date conflicts must be resolved within the first two weeks of the semester.**

Final Paper: Throughout the course of the semester, we will focus on how life has evolved through time. The biosphere and geosphere are intimately connected. Major evolutionary steps have both been influenced by, and have had an effect on, the physical world. For your final paper, you will identify and discuss what you think are the *5 major events in the evolution of life on Earth*. Additional details will be provided on Canvas.

Technology Use:

- During class, cell phones must be silenced and put away/out of sight, unless given specific instructions to use them. I understand that time-to-time there may be an emergency/extenuating circumstance that may require you to have your cellphone visible. In these events, please discuss with me. *Cell phones cannot be used as a calculator on any quizzes or exams.*
- You will not be allowed to take pictures of the board or screen. You will learn and retain the material significantly better if you write/draw things down yourself.
- If you would like to take notes on your personal laptop/tablet in class, you must come and talk to me first. Studies have shown that students retain material better if they manually write, rather than type class notes. Additionally, hand writing notes allows for the use of sketches, which is very important in science, and requires some processing of the information in order to decide what is important to write in your notes. Class PowerPoint Presentations will be provided to you after class via Canvas. Use of laptops to surf the web, login to Facebook, Skype or other networking/chat during class is unprofessional and unacceptable and will result in the loss of the privilege to use a laptop during class.

Academic Integrity: Student-professor relationships are built on trust. For example, students must trust that professors have made appropriate decisions about the structure and content of the courses they teach, and professors must trust that the assignments students turn in are their own. Acts that violate this trust undermine the educational process. The Oxford College of Emory University Honor

Code (http://oxford.emory.edu/catalog/regulations/honor-code.html) defines various forms of Honor Code violations and you should make yourself familiar with these. In this call, all examinations and assignments that are turned in for a grade falls under the regulations of the Honor Code and must represent the students' own work. Your signature on your work attests to your upholding the Honor Code.

Policy regarding students with disabilities: The Office of Accessibility Services (OAS) works with students who have disabilities to provide reasonable accommodations. In order to receive consideration for reasonable accommodations, students must contact OAS and complete the registration process. Faculty may not provide disability accommodations until an accommodation letter has been processed; accommodations are not retroactive. Students registered with OAS who receives a letter outlining specific academic accommodations are strongly encouraged to coordinate a meeting time with their professor to discuss a protocol to implement the accommodations as needed throughout the semester. This meeting should occur as early in the semester as possible. Contact OAS for more information at (770) 784-4690 or oas_oxford@emory.edu. Additional information available at: http://equityandinclusion.emory.edu/access/students/index.html.

Religious Holidays: Instructors are encouraged, not required, to accommodate students' academic needs related to religious holidays. Please make every effort to negotiate your religious holiday needs within the first two weeks of the semester; waiting longer may compromise your instructor's ability to extend satisfactory arrangements. If you need guidance negotiating your needs related to a religious holiday, the College Chaplain, Rev. Lyn Pace, ppace@emory.edu, Candler Hall 202, is willing and available to help. Rev. Pace is not tasked with excusing students from classes or writing excuses for students to take to their professors. Emory's official list of religious holidays may be found at http://www.religiouslife.emory.edu/faith_traditions/holidays.html

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LAB SESSIONS

Geology is a field-based observational science, and as such, laboratory sessions provide an excellent opportunity to learn geologic concepts and methods through applied activities. Labs are meant to supplement lecture material – to give opportunities for you apply new knowledge. Please be sure to do the following to prepare for labs so that you can work effectively and get your labs done in the time allotted:

- Labs will be posted on Canvas. You need to print and read the lab BEFORE coming to lab.
- There may be an additional video to watch prior to lab. Please check the syllabus and Canvas.
- Labs may not always correspond directly to current lectures, so you may need to review previous course and lab material for some weeks.
- You are to bring the lab, your book, and your class notes, to *every* lab. Color pencils and calculators may be beneficial for some labs.

Each lab is worth 20 pts each:

- 10 points (less for sloppy or incomplete work) will be earned simply by completing the lab in a satisfactory manner and correcting your lab using the available answer key during the lab time. When you correct your labs, make the corrections in a different color. *Do not destroy your original answer*. When you review this material for exams, then, you can see your mistakes and not repeat them. Remember, learn from your mistakes!

- 10 points will be available through a quiz on the lab material at the start of lab the following week. You will use the self-graded lab as a study guide.
- You may work independently, but you are encouraged to work with your peers in groups of 2. Sometimes you will be able to pick with whom you'd like to work and other times groups will be assigned randomly so that you get to know others in the class.
- When you are finished with the lab, you may *leave only after* 1) correcting your answers using the keys provided, and 2) "checking out" with me. *Do not leave without first watching me write your points down!*

Laboratory Absences:

- On rare occasions, illness, family emergencies and certain school-sponsored events may make it necessary for a student to miss a lab session.
- You must notify me BEFORE the day of the absence in all but the most extreme emergencies. In all cases, I will make the final decision regarding whether or not an absence is acceptable.
- You are allowed one excused absence for the semester. The lab activity must be made up within 1 week if possible (depending on the ability to re-setup the lab). Otherwise, the lab grade will be dropped from you grade.
- An unexcused absence from lab results in a 0 for that lab.
- Two unexcused lab absences will result in the failure of the course.

SYLLABUS OF LECTURE AND LAB TOPICS

Class	Date	Lecture Topic	Reading/Video	HW/Quiz
1	T - Jan. 15	Welcome and Course Overview		
2	Th - Jan. 17	Minerals	A Brief Intro to Minerals	
MLK Day – Jan. 21				
3	T - Jan. 22	Igneous, Metamorphic, and Sedimentary Rocks	Intro to Igneous Rocks Intro to Meta Rocks Intro to Sed Rocks	Pre-Class Quiz #1
4	Th - Jan. 24	Igneous, Metamorphic, and Sedimentary Rocks		
Lab 1	M - Jan. 28	*Lab: Mineral ID*	Identifying Minerals	
5	T - Jan. 29	Sed Structures, Environments, Facies	Depositional Environments	In-Class Quiz #1 HW#1
6	Th - Jan. 31	Sed Structures, Environments, Facies		
Lab 2	M - Feb. 4	*Lab: Rock ID*		
7	T- Feb. 5	Birth of the Earth	p. 7 – 25	Pre-Class Quiz #2 In-Class Quiz #2
8	Th - Feb. 7	Geologic Time	p. 25 – 30; Nance and Murphy, p. 230 - 238	Pre-Class Quiz #3
Lab 3	M - Feb. 11	*Lab: Geologic Time*		
9	T - Feb. 12	Geologic Time		In-Class Quiz #3
10	Th - Feb. 14	**EXAM 1**		
Lab 4	M - Feb. 18	*Lab: History of the Earth*		
11	T - Feb. 19	The Big Thwack	p. 31 – 52	Pre-Class Quiz #4 HW #2
12	Th - Feb. 21	Black Earth - Differentiation	p. 53 – 76	Pre-Class Quiz #5
Lab 5	M - Feb. 25	*Lab: Fossilization*		
13	T - Feb. 26	Blue Earth – Formation of Oceans	p. 77 – 101	Pre-Class Quiz #6 In-Class Quiz #4
14	Th - Feb. 28	Gray Earth – Granite Crust and Plate Tectonics	p. 102 – 119	Pre-Class Quiz #7
Lab 6	M - Mar. 4	*Lab: Plate Tectonics*		
15	T - Mar. 5	Gray Earth – Granite Crust and Plate Tectonics	p. 119 – 126	Pre-Class Quiz #8 In-Class Quiz #5
16	Th - Mar. 7	**EXAM 2**		
SPRING BREAK March 11-14				
Lab 7	M - Mar. 18	*Lab: Evolution and Natural Selection*		
17	T - Mar. 19	Living Earth – Origins of Life	p. 127 – 153	Pre-Class Quiz #9 HW#3
18	Th - Mar. 21	Red Earth – Great Oxidation Event	p. 154 - 180	Pre-Class Quiz #10
Lab 8	M - Mar. 25	*Lab: Fossil ID*		

19	T - Mar. 26	Red Earth – Great Oxidation Event		
20	Th - Mar. 28	The "Boring" Billion	p. 181 – 205	Pre-Class Quiz #11 In-Class Quiz #6
Lab 9	M - Apr. 1	*Lab: Fossil Slab Lab*		
21	T - Apr. 2	The "Boring" Billion		
22	Th - Apr. 4	White Earth	p. 206 – 231	Pre-Class Quiz #12 In-Class Quiz #7
Lab 10	M - Apr. 8	*Lab: Fossil Slab Lab*		
23	T - Apr. 9	**EXAM 3**		
24	Th - Apr. 11	Green Earth	p. 232 - 256	Pre-Class Quiz #13
Lab 11	M - Apr. 15	*Lab: Facies Mapping*		
25	T - Apr. 16	Green Earth		
26	Th - Apr. 18	Green Earth		In-Class Quiz #8
Lab 12	M - Apr. 22	*Lab: Arabia Mountain Field Trip*		
27	T - Apr. 23	Green Earth		
28	Th - Apr. 25	The Future	p. 257 - 283	Pre-Class Quiz #14 In-Class Quiz #9
Lab 13	M - Apr. 29	Exam Review		Final Paper Due
	T - May 7	**EXAM 4** 2:00 – 5:00 pm		

**** This is an ambitious schedule subject to change during the semester.** Updated syllabi will be posted to Canvas and an email will be sent out when changes have been made.

** **Not all homework assignments are listed here.** You may have additional homework assignments given throughout the semester.