

Syllabus: Geoscience 112 History of Earth and Life

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Office Hours: Mon, Wed, Fri, 2:00-3:00. Or by appointment

Lectures and Discussions: Mon, Wed, Fri 11:45-12:45 AM **In:** NSCI 201B

Laboratories In: NSCI 229

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Final Exam: Wednesday May 10, 10:15-12:15

Required Text: Historical Geology, Wicander, R., and Monroe 4th edition, 2004

Introduction

This course is about the history of the Earth and the evolution of the life forms that inhabit our planet. This is a subject that is deeply concerned with time - large amounts of time. Geological events are typically measured in millions or even billions of years. This time scale, geologic time, vastly transcends the human experience. Events that are exceedingly rare during a human lifetime may be frequent and inevitable at geological time scales. A primary objective of this course is to provide a frame of reference that incorporates a sense of geologic time. In the process, you will gain an understanding of the evolution of the Earth and the degree to which geological processes and biological evolution have influenced each other throughout Earth's history. If you take this course seriously, it will change the way you see the landscape, the biota, and your place in history.

Lecture Attendance and Course Readings

University students are adults. Therefore, lecture and lab attendance is your responsibility. However, it is highly unlikely that you will be able to perform well in this course without attending all lectures and labs. As well as further explanation and emphasis of themes discussed in the text, there will be many points discussed in class that are not in the text book. I strongly recommend that you attend all class sessions.

Most of the themes are discussed in the course textbook (Wicander and Monroe). I suggest that you bring the text to all lectures and especially the labs. I encourage you to do the readings prior to class. In doing so, you should be able to readily comprehend the lecture material which will make note-taking easy. You have spent a lot of money enrolling in this course and buying the text- get your money's worth by going to class and reading the text!

Labs

Hands-on experience in the lab is essential to a complete understanding of rock types and fossil organisms. Labs also provide an opportunity for you to make your own interpretations of the history contained in the rock record, using geological techniques. In

other words, the lab is where you will practice doing science. Consequently, labs form an important component of your grade. The final lab grade will be a sum of all your lab scores. Consequently, attendance in lab is absolutely required in order to submit your lab assignments for evaluation. Failure to attend lab or to turn in all lab exercises will result in an incomplete. So that you will not have to spend additional time on "lab homework," each lab can be completed during the scheduled lab period. However, this will require that you commit yourself for most or all of the three hours. Do not schedule other activities during any portion of the lab period.

Posters

Each of you will research a topic and prepare a poster to display your findings. Selection of a topic is up to you, but I will be glad to help if you need suggestions. You may research any subject you choose, so long as it pertains to Earth history. Your job is to explore the subject in greater depth than course lectures or textbooks permit, so be sure to select your topic accordingly. The final poster should contain both a concise summary of your findings and some informative graphics. Completed posters will be displayed for the class in mid-April. At that time you will have the opportunity to explain what you have learned to your fellow students. Note that one class period is reserved for poster displays. During this period, you'll have a few minutes to briefly summarize your findings.

Friday Quizzes

A very short, 3 point quiz will be handed out each Friday for completion in class. These quizzes are not intended to be difficult. Instead they will focus on main points of the week's lectures. The Earth is 4.6 billion years old, and the topic of its history necessarily covers lots of material. Quizzes will help you keep on top of the information and evaluate your understanding of the week's subjects. Your two lowest scores will be dropped from your final quiz grade.

Grading

Grades will be weighted as follows: 50% class, 35% lab, and 15% poster project. The class grade will be determined by performance on two midterm exams, a final exam, and quizzes. Exams and quizzes will be given only at the scheduled times. Make-up examinations will be given only under extenuating circumstances; a written explanation from your doctor or dentist will be required in the case of a medical emergency. The final examination will focus on material from the last half of the course, but you will also be expected to demonstrate a more general, comprehensive understanding of the subjects covered throughout the semester. The final exam will be given **ONLY** on the day and time scheduled by the university, so make travel and work plans accordingly. Lab grades will be based upon performance on lab exercises. Posters will be evaluated on the basis of content and presentation.

Friday Quizzes: 5%
Midterm Exam 1: 15%
Research Project/Poster: 15%
Laboratory Exercises: 35%
Final Exam: 30%

Disabilities Services

The Office of Disability Services implements the Americans with Disabilities Act (ADA) and ensures that UAF students have equal access to the campus and course materials. I will work with the Office of Disabilities Services (474-7043) to provide reasonable accommodation to students with disabilities. Please let me know at the beginning of the course if accommodations should be provided.

This is a tentative schedule of lecture and lab topics. It should be used as a general guide to the topics covered in lectures and labs. The lecture themes may deviate from this schedule somewhat and I will keep you posted as to any changes.

Tentative Lecture and Lab Schedule

Date	Topic	Reading
1/20 (F) 1	Welcome Introduction to Geologic Time	
Week #2	Lab #1: Deep Time and the Geologic Time Scale	
1/23 (M)	The source of Sedimentary rocks: Weathering and Erosion	Chapter 2 (21-29)
1/25 (W)	Sedimentary Rocks: types	Chapter 6
1/27 (F)- 4	Sedimentary Rocks: environments	Chapter 6
Week #3	Lab #2: Sedimentary Structures and Environments	
1/30 (M)	Relative ages and the principles of stratigraphy	Chapter 5 (72-79)
2/1 (W)	Fossilization: life to death to stone	Chapter 5 (79-81)
2/3 (F)- 7	The Kingdoms of Life	
Week #4	Lab #3: Fossils: Symmetry, Diversity, and Preservation	
2/6(M)	Biostratigraphy and the meaning of fossils	Chapter 5 (81-86)
2/8(W)	Construction of the relative geologic time scale	Chapter 5 (86-91)
2/10(F) -10	Radioactivity and the absolute time scale	Chapter 4 (63-69)
Week #5	Lab #4: Sequencing Geologic Events	
2/13(M)	Evolution I: Natural selection and genetics	Chapter 7 (114-120)
2/15(W)	Evolution II	
2/17(F) – 13	Diversification and extinction	Chapter 7 (120-133)
Week #6	Lab #5: Correlation of Ancient Rocks	
2/20(M)	Plate Tectonics I: Drifting continents, Paleomagnetism, Polar wander and Seafloor spreading	Chapter 3 (32-38)
2/22(W)	Plate Tectonics II: Basins and Plate Boundaries	Chapter 3 (41-53)
2/24(F) – 16	Exam #1	
Week #7	Lab #6: Exploring the UAF Museum	
2/27(M)	Origin of the Universe and Earth	Chapter 1 (4-8)

3/1(W)	Archean protocontinents	Chapter 8 (136-145)
3/3(F) – 19	The origin of life	Chapter 8 (145-150)
Week #8	Lab #7: Plate Tectonics	
3/6(M)	Proterozoic geology: Cratons and supercontinents	Chapter 9 (153-160)
3/8(W)	Proterozoic life and poisonous oxygen	Chapter 9 (160-170)
3/10(F) – 22	Snowball Earth	
Week #9 3/13-3/17	Spring Break, No Classes!!	
Week #10	Lab #8: Geologic Maps I: Fundamentals	
3/20(M)	Neo-Proterozoic life	
3/22(W)	Early Paleozoic geology: Continental seas and orogenies	Chapter 10 (174-190)
3/24(F) – 25	Invertebrates and the Cambrian explosion	Chapter 12 (216-230)
Week #11	Lab #9: Paleozoic Life I: Shallow Seas	
3/27(M)	The Burgess Shale and other Soft-bodied fossils of the Cambrian	
3/29(W)	Late Paleozoic geology: Assembling Pangea	Chapter 11 (194-212)
3/31(F) – 28	Vertebrate evolution: Stepping fin onto land	Chapter 13 (234-245)
Week #12	Lab #10: Paleozoic Life II: Wetlands	
4/3(M)	Carboniferous wetlands: When bugs were big	Chapter 13 (245-251)
4/5(W)	The Permian/Triassic Extinction: The Greatest Mass Extinction	
4/7(F) – 31	Mesozoic tectonics: Birth of the Atlantic Ocean and Mountains rise in the west	Chapter 14 (255-274)
Week #13	Lab #11: Geological Maps II: Case Studies	
4/10(M)	Mesozoic life I: Reptiles, dinosaurs, birds, and Mammalian innovations	Chapter 15 (283-296)
4/12(W)	Mesozoic life II: First flowers and flourishing forams	Chapter 15 (278-282)
4/14(F) – 34	K/T extinctions: Gradual or catastrophic?	Chapter 15 (297-298)
Week #14	Lab #12: Mesozoic Life: Predators and Burrowers	
4/17(M)	Cenozoic tectonics: Mountains and more mountains	Chapter 16 (302-325)
4/19(W)	Cenozoic carnivores: Birds are terrible lizards, too	Chapter 18 (348-360)

4/21(F) – 37	Poster Session	
Week #15	Lab #13: Field Trip/Sedimentary Rocks Exercise (9 AM on Saturday April 22) No Lab during the regular time slot	
4/24(M)	Snowball vs greenhouse: Ice sheets come and go	Chapter 17 (328-345)
4/26(W)	Evolution of Homo	Chapter 19 (371-383)
4/28(F)	Nanook Springfest – No Class	
Week #16	Lab #14: Trip to the Permafrost Tunnel. Time to be determined.	
5/1(M) – 40	Where have all the giant Pleistocene mammals gone?	Chapter 18 (352-368)
5/3(W)	Course summary	
5/5(F)	Questions and Answers	
5/10 (W)	Final Exam: 10:15 AM – 12:15 PM	