

ESCI 402 – Earth History

Instructor:

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Office Hours: Tue 10-12 AM

TAs:

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Course Description : This course provides the knowledge and skills necessary to interpret, understand, and appreciate Earth's 4.6 billion-year history. The first third of the course introduces basic principles, including geological materials, plate tectonics, geological time, fossil preservation, and biological evolution. The remainder of the course tells the story of Earth history through case studies that illustrate the scientific methods used to reconstruct critical events in our planet's evolution through time. Topics include the origin of the Earth, the Cambrian explosion of life, building of the Appalachians, assembly of Pangaea, the rise and fall of dinosaurs, the formation of the Rocky Mountains, mammalian evolution, and Pleistocene glaciation.

Lecture: MWF 11:10–12:00 (James G46)

Labs: Mon 1:10–3:30, 3:40–6:00, 6:40–9:00; Tue 2:10–4:30 (James 240)

Web Page: <http://earth.unh.edu/esci402/esci402.html> (link to this site is available on Blackboard)

Grading: Test 1 (20%), Test 2 (20%), Final Exam (35%), Labs (25%)

Textbook: Levin, H.L., 2010 (9th edition), *The Earth Through Time*, John Wiley & Sons, Inc.

Introduction

Jan. 26 Wed Introduction – What is historical geology and why is it important? (Ch.1)
28 Fri Founding ideas of historical geology (Ch.2)
No Lab

Part 1 – Basic Geological Principles

31 Mon Geological building blocks (Ch.4)
Feb. 2 Wed Minerals and rocks (Ch.4)
4 Fri Rocks and the geological cycle (Ch.4)
Lab 1 Minerals, igneous rocks & metamorphic rocks

Feb. 7 Mon Weathering and sedimentation (Ch.4:67-72)
9 Wed Interpreting sedimentary rocks (Ch. 5: 81-102)
. 11 Fri Fossils and preservation (Ch.6:125-130)
Lab 2 Sediments, sedimentary rocks & sedimentary structures

Feb. 14 Mon Plate tectonics (Ch.7)
16 Wed Plate tectonics (Ch.7)
18 Fri Principles of stratigraphy (Ch.5:102-122, Ch. 6:145-149)
Lab 3 Fossils: preservation and invertebrate classification

Feb. 21 Mon Stratigraphic relations and correlation (review Ch.7:174-177)
23 Wed The geological time scale (Ch.3)
25 Fri Test 1
Lab 4 Stratigraphic correlation and the time scale

Feb. 28 Mon Numerical dating: calibrating the time scale (Ch.3)
Mar. 2 Wed Evolution: basic principles (Ch.6:131-145)
4 Fri Evolution: a geological perspective (Ch.6: 149-165)
Lab 5 Geologic maps and cross sections

Part 2 – Case Studies

Case Study 1 – The origin and early evolution of the earth (Ch.8:213-235)

- Mar. 7 Mon The solar system and Earth accretion
 9 Wed Differentiation and crust formation
 11 Fri Evolution of the atmosphere and hydrosphere
Lab 6 James Hall geologic quad and cross section I

SPRING BREAK

Case Study 2 – The origin of life and the Cambrian explosion (Ch.8:235-246, Ch.9:260-271, Ch.12:333-341)

- Mar 21 Mon New theories on the origin of life
 23 Wed The earliest fossils
 25 Fri Burgess shale and evolutionary diversification
Lab 7 James Hall geologic quad and cross section II

Case Study 3 – Appalachian mountains (Ch.10:273-285,287-298, Ch.11:301-307, 314-321, Ch.12:341-358)

- Mar. 28 Mon Taconic orogeny
 30 Wed Acadian and Allegheny orogenies
 Apr 1 Fri Appalachian basins and their paleontological record
Lab 8 James Hall depositional environments

Case Study 4 – Pangaea and the Permo-Triassic boundary (Ch.12:374-378, Ch.13:381-383; Ch.14:413-417)

- Apr. 4 Mon A world with one continent
 6 Wed P/T boundary and the nature of extinctions
8 Fri Test 2
Lab 9 Regional Geology of North America – Appalachians

Case Study 5 – Dinosaurs (Ch.12:358-371, Ch.14:413-417,423-449,455-462)

- Apr. 11 Mon Origin and diversification
 13 Wed Paleocology: changing views
 15 Fri Dinosaur extinction and the K/T boundary
Lab 10 Playing Wegener in a mock world

Case Study 6 – Western Cordillera (Ch.10:285-287, Ch.11:307-314,321-323, Ch.13:386-404, Ch.15:469-483)

- Apr. 18 Mon Ancestral Rocky Mountain uplift and interior seaways
 20 Wed Laramide and Sevier style deformation
 22 Fri Collapse, extension, and hot spots
Lab 11 Dinosaur Locomotion

Lab 13 Saturday, April 23, Field Trip, Odiorne Point

Case Study 7 – Mammal and human evolution (Ch.14:449-453, Ch.16; Ch. 17)

- Apr. 25 Mon The earliest mammals
 27 Wed Mammalian diversification and the origins of primates
 29 Fri Human evolution
Lab 12 Regional geology of North America – Cordillera

Case Study 8 – Pleistocene glaciation (Ch.15:465-468, 486-498)

- May 2 Mon How glaciers form and their impact on the landscape
 4 Wed Marine and ice core evidence of past glaciations
 6 Fri The cause and effects of Pleistocene glaciations
Lab 14 Lab Test

- May 9 Mon Global warming in a geological context

Final Exam: Thursday, May 12, 3:30–5:30 PM, James G46

Class Policies

Lectures: Your attendance at lectures is critical to your learning experience in this class. 4.6 billion years of history is a lot of material for one class. This means that we will focus on certain periods (i.e. “Case Studies”) and the *only* way you will know what we cover is to come to lecture and take notes.

Labs: The TAs will be leading the labs and attendance at all labs is mandatory. If you must miss your lab section because of illness or some other emergency, please arrange with the TAs ahead-of-time to attend a different lab section. Lab assignments will be graded out of 20 points each. TAs will announce the due date for each lab exercise. Most lab exercises are due at the end of current lab session or at the beginning of the following lab session. Late labs will lose an additional 10% each day they are late. The TAs will provide additional laboratory guidelines at the beginning of the semester.

Field Trip: The field trip is mandatory. Please mark this trip in your calendar. If you have a legitimate conflict, there will be an alternate trip available during the school week but you must sign up for this with Prof. Clyde ahead of time.

Exam Policy: You must be present at all exams unless explicitly excused ahead-of-time by Prof. Clyde. No exceptions.

Cell phones: Please be respectful of your instructors and colleagues - do not use cell phones, PDAs, pagers, digital music players, laptops or other electronic devices during class unless it is being used specifically for a class or lab activity (e.g. taking notes, using calculator etc).

Academic integrity: You are expected to conduct yourselves in an honest and ethical manner and respect the intellectual work of others. Please refer to the UNH Student Code of Conduct (<http://www.unh.edu/student/rights/>) for more details.

Disability Accommodations: The University is committed to providing students with documented disabilities equal access to all university programs and facilities. If you think you have a disability requiring accommodations, you must register with Disability Services for Students (DSS). Contact DSS at (603) 862-2607 or visit them in MUB 118. If you have received Accommodation Letters for this course from DSS, please provide me with that information privately so that we can review those accommodations.