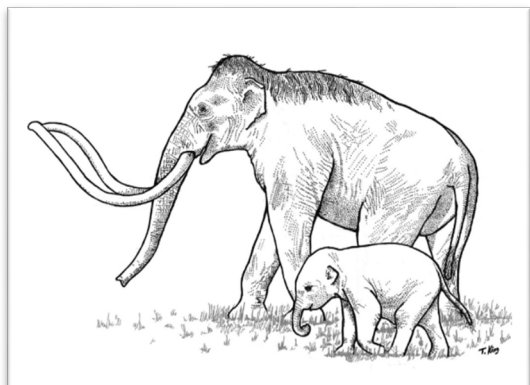


GEOL 1304-010 HISTORICAL GEOLOGY

SPRING 2022

MWF 11:00 – 11:50 am



Columbian mammoths roamed the Concho and Colorado River valleys in the Pleistocene Ice Ages (Ch 19). ASU fossil collections include mammoth bones, teeth, and a tusk. Mammoth bones have been excavated in San Angelo State Park. Sketch by Tim King, Santa Clara University (from San Jose State news release).

Instructor: Mr. Stephen Shields

Email: stephen.shields@angelo.edu

Phone: 325-486-6934

Office: VIN 135

Office Hours: Virtual and in-person hours are below

Monday: 1 – 4pm; Tuesday: 2 – 4pm; Friday 2 – 3pm

Course Description

Application of geological principles to interpret four billion years of Earth history recorded in rocks. Includes evolutionary changes and the use of fossils in time and space.

Course Delivery Style: Face to Face

This is a face-to-face course with online components that students are expected to access in [Blackboard](#).ⁱ You will find lecture slides, web links, practice problems, homework, and interesting papers on the Blackboard page. New material will be presented every day, with supplemental activities in-class to reinforce the material. It is imperative you attend all classes in-person.

Required Textbook

1. *Earth System History, Fourth Edition*, by Steven M. Stanley

Grading

- 2 exams (46%, 23% each)
- 1 comprehensive final exam (30%)
- 4 homework assignments (24%; 6% each).
- Extra Credit Project (+ 0 – 10%). Brief, illustrated report about a scientific paper on a geology topic of your own choosing. Details provided after Exam 1.

Assignment Descriptions

- 1) Exams will focus primarily on material presented on in class, but can cover any information presented in the textbook or found in the online homework assignments.
- 2) In-class activities/projects are designed to help you better understand the weekly material. These will be submitted as homework assignments.

Academic Integrity

Students are expected to maintain complete honesty and integrity in all work. Any student found guilty of any form of dishonesty in academic work is subject of disciplinary action and possible expulsion from ASU.

The College of Science and Engineering adheres to the [Statement of Academic Integrity](#)⁴. Policy for this course: first offense- zero for exam or assignment, second offense- F in course

Plagiarism

Plagiarism is a serious topic covered in ASU's Academic Integrity policy in the Student Handbook. Plagiarism is the action or practice of taking someone else's work, idea, etc., and passing it off as one's own. Plagiarism is literary theft.

In your discussions and/or your papers, it is unacceptable to copy word-for-word without quotation marks and the source of the quotation. It is expected that you will summarize or paraphrase ideas giving appropriate credit to the source both in the body of your paper and the reference list.

Papers are subject to be evaluated for originality via Turnitin. Resources to help you understand this policy better are available at the [ASU Writing Center](#)⁵

Schedule

Dates	Topics	Required reading
I: 1/18 – 1/21	Earth as a System The geologic time scale Fundamental Geologic Principles (~6) Unconformity types <i>Project- Working out Sequences of Events</i>	Chapter 1
II: 1/24 – 1/28	Describing sedimentary rocks Fossil Preservation Methods Domains: Major groups of life forms <i>Project Fossil preservation methods</i> HOMEWORK 1 DUE 2/4	Chapter 2 and 3
III: 1/31 – 2/4	Non-marine sedimentary environments Shallow, deep marine sedimentary environments <i>Project- Flute casts on houses</i>	Chapter 5
IV: 2/7 – 2/11	Records of Sea Level Change Time Correlation: biostratigraphy, magnetic stratigraphy Formations, Members, Groups, Beds Lithologic correlation <i>Project: Correlating strata (2/14)</i> HOMEWORK 2 DUE 2/18	Chapter 6
V: 2/14 – 2/18	Radioactive decay provides Absolute Ages Oldest rocks dated: Earth, Moon, meteorites <i>Project- M&M Radioactive decay (2/18)</i> <i>Project- Calculating rock ages (2/18)</i> Exam 1 on 2/23 (chapters 1, 2, 3, 5, and 6)	Chapter 6
VI: 2/21 – 2/25 3/7 – 3/11	Scientific Method in geology Organic Evolution: Charles Darwin's contribution Genes, DNA, and chromosomes Evolutionary radiations and other trends Intro to Plate Tectonics	Chapter 7 Chapter 8
VII: 2/28 – 3/4 3/21 – 3/25	Makeup of a Continent: Shields, Cratons, more Oldest Fossils, Stromatolites, and Origin of Life Identifying thrust faults, anticlines, and synclines Distinguishing 4 contact types on a geologic map The Proterozoic Grenville Orogeny <i>Project and Homework 3: Interpreting Llanouplift geologic maps</i>	Chapter 11: p. 252-253 Chapter 11: p. 256-272 Chapter 9: p. 195-196, 210-211 Chapter 12: p. 296-298
VIII: 3/28 – 4/1	Plate Tectonics and Mountain Building Homework 3 Due 3/30	Chapter 8 and 9
IX: 3/14 – 3/18	Spring Break No Class	

Dates	Topics	Required reading
X: 3/21 – 3/25	Late Paleozoic vertebrates: giant amphibians, early reptiles (first amniotes), pelecysaurs, therapsids, Occam's Razor	Ch 15
XI: 3/28 – 4/1	Late Paleozoic mountains and reefs in West Texas Pangea begins to fragment, Fault block basins Triassic	Ch 15
XII: 4/4 – 4/8	<i>Project: Construct Permian basin thickness map and cross-section</i> and Construct Permian Basin Cross-section Marathon – Ouachita Orogeny in West Texas (Ch 15) Late Paleozoic and Early Mesozoic No Class on 4/6 and 4/8: Look on Blackboard for Notes	Ch 15 and 16
XIII: 4/11 – 4/15	Exam 2 4/13 (On Chapter 6, 7, 11, 12, 15, and 16) Therapsid Mass Extinction, End Triassic: causes, effects Rise of Dinosaurs: Why So Successful? Pterosaurs vs Birds (Ch 17)	Chapter 17
XIV: 4/18 – 4/22	The Cretaceous World (Ch 17) Dinosaur extinction hypotheses and tests The rise of the Rocky Mountains The Paleogene World <i>Project: Viewing rocks under polarizing scopes</i>	Chapter 17 Chapter 18
XV: 4/25 – 4/29	Cenozoic volcanoes in West Texas, Rio Grande Rift The Pleistocene Epoch: the first humans, Ice Ages, and woolly mammoths (Ch. 18, 19) HOMEWORK 4 DUE 4/29	Chapters 19, and 20
XVI: 5/2 – 5/6	Dead Week Review of Historical geology Problem-solving techniques Review project: 3-D Images of active Faults in Basin and Range and California Review Project: constructing thickness map Review Project: Grand Canyon Seq. of Events	
XVII: 5/9 – 5/13	5/11: 10:30 am – 12:30 pm: FINAL EXAM	

Field Trips!

On field trips you will get a chance to apply concepts discussed in class to describe and interpret outcrops of rocks and sediments. On required lab trips and optional trips, you must travel by yourself in your own vehicle. No special equipment is required. You may go on more than one optional trip, but you can only use one field trip project to replace a single homework or lab assignment grade. Tentative schedule:

1. *Rocker B Ranch field trip*: Saturday, May 7: Learn W. Edwards Plateau geology and collect fossils at the historic Rocker B Ranch outside Mertzon and Barnhart.
2. *Christoval or Lake Brownwood fossil-collecting field trip*: Saturday, TBA: Collect fossils at two localities in the San Angelo area.

Student Learning Outcomes

1. To practice problem-solving techniques used to interpret the history of Earth. Many of these are applicable to other fields and to everyday life. Problem-solving techniques that you will practice:
 - Use multiple working hypotheses
 - Be skeptical: look for ways to test hypotheses
 - Make sketches: they help in visualizing the world in three dimensions
 - Quantify events and processes when possible
 - Apply the Principle of Uniformitarianism
 - Study and work together
2. Get as much practice or experience as you can to find out about major events in Earth history over the last 5 billion years, including the appearance of diverse living things, changes in climate, and the rise of mountains
3. To recognize, and make interpretations from, common rock types, fossils and landforms present in West Texas and western North America

Learning outcomes 1 – 3 will be evaluated by grades on exams, projects, activities, and homework.

Core-course learning objectives

1. Critical Thinking Core Objective, SLO1: Students will be able to state a question, gather information, analyze data, identify assumptions, develop hypotheses, and evaluate results to arrive at an answer to a question.
2. Communication Core Objective, SLO2: Students will be able to represent, organize, format, and display data and information visually.

Geoscience Careers

See Geoscience BS requirements in the [Angelo State Catalog](#)⁶. A Geoscience Minor requires 18 hours of geology courses. Physical Geology is a requirement for a major or a minor. Rewarding careers exist for geologists, geophysicists, hydrogeologists, and secondary science teachers. Talk to your professors!

The [US Department of Labor Occupational Handbook](#)⁷ contains information on geology careers, salaries, education needed, and future job outlook in geology.

GEO, the student organization for all interested in geology, meets twice a month, Wednesdays at 6:00 pm. The first meeting is January 23. GEO is a Student Chapter of [American Association of Petroleum Geologists](#)⁸.

Accommodations for Students with Disabilities

ASU is committed to the principle that no qualified individual with a disability shall, on the basis of disability, be excluded from participation in or be denied the benefits of the services, programs or activities of the university, or be subjected to discrimination by the university, as provided by the Americans with Disabilities Act of 1990 (ADA), the Americans with Disabilities Act Amendments of 2008 (ADAAA), and subsequent legislation.

Student Disability Services is located in the Office of Student Affairs, and is the designated campus department charged with the responsibility of reviewing and authorizing requests for reasonable accommodations based on a disability. It is the student's responsibility to initiate such a request by contacting an employee of the Office of Student Affairs, in the Houston Harte University Center, Room 112, or contacting the department via email at ADA@angelo.edu. For more information about the application process and requirements, visit the [Student Disability Services website](#).⁹ The employee charged with the responsibility of reviewing and authorizing accommodation requests is:

Dallas Swafford, Director of Student Disability Services
Office of Student Affairs, Houston Harte University Center, Room 112

Student Absence for Observance of Religious Holy Days

A student who intends to observe a religious holy day should make that intention known in writing to the instructor prior to the absence. See [ASU Operating Policy 10.19 Student Absence for Observance of Religious Holy Day](#)¹⁰ for more information

Incomplete Grade Policy

It is policy that incomplete grades be reserved for student illness or personal misfortune. Please contact faculty if you have serious illness or a personal misfortune that would keep you from completing course work. Documentation may be required. See [ASU Operating Policy 10.11 Grading Procedures](#)¹¹ for more information.

Title IX

The University prohibits discrimination based on sex, which includes pregnancy, sexual orientation, gender identity, and other types of Sexual Misconduct. Sexual Misconduct is a broad term encompassing all forms of gender-based harassment or discrimination including: sexual assault, sex-based discrimination, sexual exploitation, sexual harassment, public indecency, interpersonal violence (domestic violence and/or dating violence), and stalking. As a faculty member, I am a Responsible Employee meaning that I am obligated by law and ASU policy to report any allegations I am notified of to the Office of Title IX Compliance.

Students are encouraged to report any incidents of sexual misconduct directly to ASU's Office of Title IX Compliance and the Director of Title IX Compliance/Title IX Coordinator at:

Michelle Miller, J.D.

Special Assistant to the President and Title IX Coordinator

Mayer Administration Building, Room 210

325-486-6357

325-942-2022, michelle.boone@angelo.edu

You may also [file a report online](#)¹² 24/7.

If you are wishing to speak to someone about an incident in confidence you may contact the University Health Clinic and Counseling Center at 325-942-2173 or the ASU Crisis Helpline at 325-486-6345.

For more information, visit [Title IX website](#)¹³.

Modifications to the Syllabus

This syllabus, including grade evaluation and course schedule, is subject to modification. In particular, the COVID-19 pandemic may require significant changes in course delivery and content on potentially short notice.

General Policies Related to This Course

All students are required to follow the policies and procedures presented in these documents:

- [Angelo State University Student Handbook](#)¹⁵
- [Angelo State University Catalog](#)¹⁶

¹ <https://angelo.blackboard.com/>

² <https://www.angelo.edu/covid-19/returning-to-campus/health-and-safety.php>

³ <https://angelo.blackboard.com/>

⁴ <https://www.angelo.edu/student-handbook/community-policies/academic-integrity.php>

⁵ https://www.angelo.edu/dept/writing_center/academic_honesty.php

⁶ https://www.angelo.edu/dept/physics/geoscience_degree.php

- ⁷ <https://www.bls.gov/ooh/life-physical-and-social-science/print/geoscientists.htm>
- ⁸ <https://www.aapg.org/about/membership/types/student>
- ⁹ <https://www.angelo.edu/services/disability-services/>
- ¹⁰ <https://www.angelo.edu/content/files/14206-op-1019-student-absence-for-observance-of>
- ¹¹ <https://www.angelo.edu/content/files/14197-op-1011-grading-procedures>
- ¹² <http://www.angelo.edu/incident-form>
- ¹³ www.angelo.edu/title-ix
- ¹⁴ <http://www.texastech.edu/downloads/ttus-policy-face-coverings.pdf>
- ¹⁵ <https://www.angelo.edu/student-handbook/>
- ¹⁶ <https://www.angelo.edu/catalogs/>

ⁱ <https://blackboard.angelo.edu/>