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).

Professor: Dr. J.I. “Joe” Satterfield
Office: VIN 122
Office phone: 325-486-6766
Physics and Geosciences Department Office: 325-942-2242
E-mail: joseph.satterfield@angelo.edu

Office hours
- Monday and Wednesday: 8:00 – 10:00 am, 2:00 – 3:00 pm
- Tuesday and Thursday: 11:00 – 12:00 noon
- Friday: 8:00 – 10:00 am
- Or contact me to set up a convenient time to meet

Required Textbooks
2. *ASU Historical Geology Lab Manual*, by Heather L. Lehto (purchase from ASU Bookstore)

Grading
- 2 exams (13% each)
- 1 comprehensive final exam (18%)
- 2 homework assignments (3% each).
- 2 lab quizzes (10% each),
- 10 graded lab exercises (3% each)
- 1 Extra Credit Project (+ 0 – 5%). Brief, illustrated report about a Historical Geology topic that you choose. Detailed instructions will be distributed in class after Exam 1.
- 1 optional field trip project. Make up a single lab or homework grade by participating on an optional field trip and turning in a brief project report. More details on next page.

Attendance Policy
You are expected to attend every class meeting. Your attendance will be recorded. We will discuss many topics of Texas and western North American geology that are not in the textbook. If you must miss a class, I can provide information on how to catch up.
<table>
<thead>
<tr>
<th>Dates</th>
<th>Topics</th>
<th>Lab Schedule</th>
</tr>
</thead>
</table>
| I: 1/14, 1/16, 1/18 | Earth as a System (Ch 1)  
The geologic time scale  
How to recognize, evaluate results of science  
Fundamental Geologic Principles (~6)  
Project: Working out Sequences of Events | 1: Rock-forming minerals  
(Lab Manual Ch 1) |
| II: 1/23, 1/25 | Describing sedimentary rocks (Ch 2)  
The diversity of life and fossils (Ch 3) | LABS DO NOT MEET  
(MLK HOLIDAY ON MONDAY) |
| III: 1/28, 1/30, 2/1 | Sedimentary Environments (Ch 5)  
Transgressions and regressions | 2: Sedimentary rocks: Describing and interpreting sedimentary environments  
(Lab Manual Ch 2) |
| IV: 2/4, 2/6, 2/8 | Correlation and Dating of the Rock Record (Ch 6)  
Project: Ordering geologic events  
Project: Correlating strata  
2/8: HOMEWORK ASSIGNMENT 1 DUE | 3: Stratigraphic column of rocks in Concho River Valley  
(Lab Manual Ch 3) |
| V: 2/11, 2/13, 2/15 | Project: Calculating rock ages  
Project: M&M Radioactive decay  
2/15: EXAM 1 | 4: Igneous and metamorphic rocks  
(Lab Manual Ch 4) |
| VI: 2/18, 2/20, 2/22 | Evolution and the Fossil Record (Ch 7)  
Project: Bird beak contest | 5: FIELD TRIP 1 - Permian trackways, San Angelo State Park  
(Lab Manual Ch 5)  
LAB 5 DUE AT END OF TRIP |
| VII: 2/25, 2/27, 3/1 | Hadean, Archean Eons of Precambrian (Ch 11)  
Proterozoic Eon of Precambrian (Ch 12)  
Project: Interpreting Llano uplift geologic maps | Review all rocks in lab  
Practice Quiz on describing rocks |
| VIII: 3/4, 3/6, 3/8 | First land vertebrates (Ch 14)  
Late Paleozoic mountain-building, reefs in W. Texas (Ch 15) | LAB QUIZ 1:  
DESCRIBING ROCKS (Labs 1, 2, 4, and 5) |

3/11 – 3/15 SPRING BREAK – GET OUTSIDE!

| IX: 3/18, 3/20, 3/22 | Project: Construct Permian basin/Guadalupe Mountains map and cross-section  
3/22: HOMEWORK ASSIGNMENT 2 DUE | 6: Paleogeographic maps  
(Lab Manual Ch 6) |
| X: 3/25, 3/27, 3/29 | The Early Mesozoic Era (Ch 16) | 7: Fossils, Keys to Past Life  
(Lab Manual Ch 7) |
| XI: 4/1, 4/3, 4/5 | Giant aquatic reptiles: Ichthyosaurs, Mosasaurs  
4/5: EXAM 2 | 8: More Common Texas Fossils  
(Lab Manual Ch 8) |
| XII: 4/8, 4/10, 4/12 | 4/8: Guest speaker (SW AAPG Meeting, Dallas)  
Dinosaurs | 9: FIELD TRIP 2: Fossil Localities near Christoval  
(Lab Manual Ch 9)  
LAB 9 DUE AT END OF TRIP |
<table>
<thead>
<tr>
<th>Dates</th>
<th>Topics</th>
<th>Lab Schedule</th>
</tr>
</thead>
<tbody>
<tr>
<td>XIII:</td>
<td>4/15, 4/17, 4/19</td>
<td>The Cretaceous World (Ch 17)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Dinosaur extinction hypotheses and tests</td>
</tr>
<tr>
<td></td>
<td></td>
<td>The rise of the Rocky Mountains</td>
</tr>
<tr>
<td>XIV:</td>
<td>4/22, 4/24, 4/26</td>
<td>Cenozoic volcanoes in West Texas</td>
</tr>
<tr>
<td></td>
<td></td>
<td>The Pleistocene Epoch: the first humans, Ice Ages, and woolly mammoths (Ch. 18, 19)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Review all fossils in lab</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Practice Quiz on fossils</td>
</tr>
<tr>
<td>XV:</td>
<td>4/29, 5/1, 5/3</td>
<td>Dead Week Review of Historical geology</td>
</tr>
<tr>
<td></td>
<td></td>
<td>problem-solving techniques</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Review project: 3-D Images of active Faults in Basin and Range and California</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Review Project: constructing thickness map</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Review Project: Grand Canyon Seq. of Events</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5/2: All make-up exams</td>
</tr>
<tr>
<td>XVI:</td>
<td>5/6</td>
<td>5/6: 10:30 – 12:30: FINAL EXAM</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Lab does not meet!</td>
</tr>
</tbody>
</table>

**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 the optional weekend trips we will travel in university vehicles. No special equipment is required but space is limited! 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. *Girl Scout STEM Conference*: Saturday, February 17: for Middle School and High School young women, various rooms and labs on ASU campus. Some volunteer opportunities on Friday, February 16. Leaders: Heather Lehto,
3. *Art and Science Day at the San Angelo Museum of Fine Art*: Saturday, April 13. Leaders: Heather Lehto,
4. *Elementary School Science Nights*: evenings to be announced. Opportunities for sharing basics of rocks, fossils, and maps with students, their parents, and interested people of all ages.

**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 objectives 1 – 3 will be evaluated by grades on exams, lab projects, lab quizzes, 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.

SLO1 will be evaluated by Lab Quiz 1 (Describing Rocks) scores. SLO2 will be evaluated by scores on Lab 3 (Stratigraphic column of rocks in the Concho River Valley).

Course Webpages
The Angelo State Blackboard site contains PowerPoint slides, web links to scenic areas mentioned in class, practice problems, answers to lab assignments, and your official grades.

Geoscience Careers
See Geoscience BS requirements in the Angelo State Catalog. 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 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.

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.

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.

Copyright Policy
Students officially enrolled in this course should make only one printed copy of the given articles and/or chapters. You are expressly prohibited from distributing or reproducing any portion of course readings in printed or electronic form without written permission from the copyright holders or publishers.
Student Disability Services
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.

The Office of Student Affairs is the designated campus department charged with the responsibility of reviewing and authorizing requests for reasonable accommodations based on a disability, and it is the student’s responsibility to initiate such a request by contacting: Ms. Dallas A. Swafford, Director of Student Disability Services, 325-942-2047

Title IX
Angelo State University is committed to the safety and security of all students. If you or someone you know experience sexual harassment, sexual assault, domestic or dating violence, stalking, or discrimination, you may contact ASU’s Title IX Coordinator: Michelle Nicole Boone, J.D., Director of Title IX Compliance, 325-486-6357, michelle.boone@angelo.edu, Mayer Administration Building 204A

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 Day8 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 Procedures9 for more information.

General Policies Related to This Course
All students are required to follow the policies and procedures presented in these documents:

- Angelo State University Student Handbook10
- Angelo State University Catalog11

1 https://www.nps.gov/waco/index.htm
2 https://blackboard.angelo.edu
3 https://www.angelo.edu/dept/physics/geoscience_degree.php
5 https://www.aapg.org/about/membership/types/student
6 https://www.angelo.edu/student-handbook/community-policies/academic-integrity.php
7 https://www.angelo.edu/dept/writing_center/academic_honesty.php
8 https://www.angelo.edu/content/files/14206-op-1019-student-absence-for-observance-of
9 https://www.angelo.edu/content/files/14197-op-1011-grading-procedures
10 https://www.angelo.edu/student-handbook/
11 https://www.angelo.edu/catalogs/