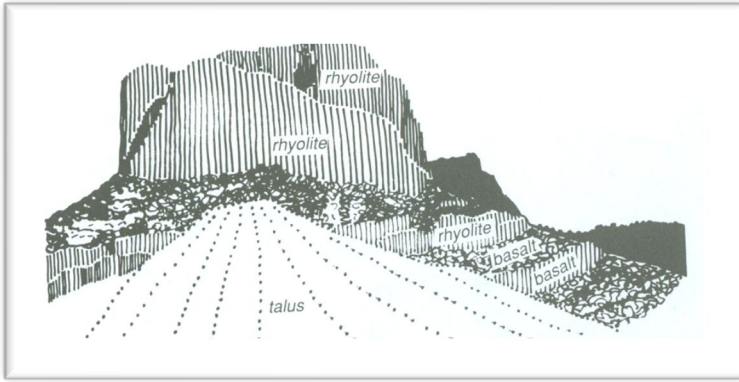


TR – 9:30 GEOL 1303: PHYSICAL GEOLOGY LECTURE, FALL 2021 (Revised 9/27/21)



Geology of Casa Grande Peak in Big Bend National Park. We will hike in this area on our November field trip! Figure from Spearing (1991)

Course Description

Earth materials, structure, landforms, mineral resources, and the processes that form them. Includes plate tectonics and how humans are affected by Earth processes.

Course Delivery Style: On-campus class

Physical Geology lecture will be taught face-to-face in the GEO Lab, VIN 139. We will spend much time in class on projects applying terms and concepts to solve problems. Short videos featuring Dr. Joe and posted on Blackboard coupled with extensive reading in textbook will introduce terms and concepts.

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

On-campus, Face-to-face Office hours (meet in my office, VIN 122)

- Tuesday: 2:00 – 5:00 pm
- Wednesday: 8:00 – 12:00 am
- Thursday: 8:00 – 9:00 am
- Or contact me to set up a convenient time to meet or talk

Required Textbook and Technology Requirement

- *Earth: Portrait of a Planet, Sixth Edition, including Smartwork5 access*, by Stephen Marshak, W.W. Norton
- If used textbook: purchase SmartWork5 for Earth Portrait of a Planet at [Smartwork5 Access](#)¹
- SmartWork 5 student set number for our class: 482115

Grading

- 2 exams (50%, 25% each)
- 1 comprehensive final exam (25%)
- 5 homework assignments using SmartWork5 (25%, 5% each).
- Extra Credit Project (+ 0 – 10%). Brief report about a scientific paper that you choose. Details after Exam 1.

Course Webpages

The [Angelo State Blackboard site](#)² contains full-size, slightly annotated PowerPoint slides, web links to scenic areas mentioned in class, practice problems, answers to homework assignments, and your official grades.

Schedule (Revised 9/27/2021)

Week	Lecture/Discussion Topics	Assigned reading before class
I: 8/24, 8/26	Flipgrid introductions Journey to the center of Earth (Ch 1, 2) Patterns in Nature: Minerals (Ch 5) <i>Project: Minerals under ultraviolet light</i>	p. 47 – 50 (Basic Characteristics of Earth) p. 51 – 63 (Earth layers) p. 33 – 37 (formation of Earth and Moon) p. 10 – 11 (Box P.1, The Scientific Method) p. 122 – 123 (What is a Mineral?) p. 126 – 127, 133 – 136 (Physical properties) p. 136 – 140 (silicate and carbonate minerals)
II: 8/31, 9/2	<i>Project: Discovering Plate Boundaries, Part 1 (Ch 4)</i> <i>Project: Discovering Plate Boundaries, Part 2</i> 9/2: HOMEWORK 1 DUE	p. 91 – 94 (Plate Tectonics, What we Mean) p. 95 – 113 (three plate boundary types)
III: 9/7, 9/9	<i>Plate Boundaries Wrap-up (Ch 4) by Dr. Koeman-Shields</i> Magma and igneous rocks (Ch 6): Presentation by Mr. Steve Shields of Dr. Koeman-Shields' slides	p. 161 – 163 (Intrusive vs extrusive rocks) p. 172 – 178 (Forms of magmatic intrusions)
IV: 9/14, 9/16	Pages of Earth's Past: Sedimentary Rocks (Ch 7): Presentation by Ms. Jessica Garza	p. 224 – 225 (Bedding and Stratification) p. 211 – 218 (Clastic Sedimentary Rocks) p. 218 – 223 (Biochemical, Organic, and Chemical Sedimentary Rocks) p. 229 – 233 (Interpreting Depositional Environments)
V: 9/21, 9/23	Metamorphic Rocks (Ch 8): Presentation by Dr. Lehto Volcanoes! (Ch 9): Presentation by Dr. Lehto 9/23: HOMEWORK 2 DUE	p. 242 – 249 (causes of metamorphism) p. 249 – 255 (meta rock textures, names) p. 259 – 260, 262 – 263 (contact, regional, and shock meta) p. 264 – 265 (big summary diagrams) p. 280-290 (products of eruptions) p. 290-297 (types of volcanoes) p. 300-301 (Infamous eruptions) p. 308-311 (volcanic hazards) p. 304 – 308 (hot spots and flood basalts)
VI: 9/28, 9/30	Review games to prepare for Exam 1 <i>Project: Making a 3-D volcano model</i> <i>Project: Calculating Plate velocity from Hot Spots</i> 9/30: Geologic Maps (Ch 7, Ch 12, not on Exam 1)	p. 224, 226 (formations) p. 459 – 461 (formations, strat columns) p. 462 – 464 (geologic maps) p. 464 – 466, 476-479 (geologic time scale)
VII: 10/5, 10/7	10/5: EXAM 1: Chapters 1, 2, 4, 5, 6, 7, and 8 <i>HW3, Project: Introduction to Edwards Plateau geology</i> Geologic Maps continued	
VIII: 10/12, 10/14	A Violent Pulse: Earthquakes (Ch 10) <i>Project: Locating Earthquake epicenters</i> 10/14: HOMEWORK 3 DUE	p. 325-326 (faults in the Crust) p. 333-338(seismic waves, measurement) p. 342-348 (where, why quakes occur) p. 348-359 (earthquake damage) p. 608-618, 622-623 (landslides, Ch 16)
IX: 10/19, 10/21	Strike and Dip, Folds, and Faults (Ch 11) <i>Project: Constructing block diagrams of structures</i>	p. 396 (stretching, shortening, shearing) p. 400 -401 (Box 11.1: Strike and dip) p. 405-408 (fold types)
X:	Mountain Building (Ch 11, p. 379)	p. 397-404 (joints, fault types)

10/26, 10/28	<i>Project: Fault games with wood blocks</i> <i>Project: Viewing mountains in 3-D</i> 10/23: Review Games (Ch 11), HOMEWORK 4 DUE	p. 411- 417 (causes of Mountain Building)
XI: 11/2, 11/4	11/2: HOMEWORK 4 DUE Oil, natural gas resources in Texas (Ch 14) <i>Bronte Oil Field Project</i>	p. 529-532 (characteristics of source beds, reservoirs, seals; trap types)
XII: 11/9, 11/11	11/9: EXAM 2: Chapters 7, 9, 10, 11, and 14 11/11: Wind and deserts: Chihuahuan Desert, West Texas, Great Basin, Nevada (Ch 21)	p. 806-811 (desert varnish, wind erosion) p. 812-814 (Alluvial fans, playas, salt lakes) p. 818-819 (desert pavement) p. 819-823 (sand dunes)
XIII: 11/16, 11/18	Streams and Floods (Ch 17) <i>Project: Mapping meandering river landforms</i> <i>Project: Constructing Rum Brook profile</i>	p. 646-647 (longitudinal profiles) p. 649-653 (braided and meandering streams) p. 657-658 (incised meanders) p. 662-663 (Geology at a Glance figure)
XIV: 11/23	Groundwater (Ch.19): San Solomon Springs, Davis Mtns 11/23: HOMEWORK 5 DUE	p. 722-725 (porosity, permeability, aquitards, aquifers) p. 726-729: (water table, saturated zone, unsaturated zone) p. 733-734 (springs)
XV: 11/30, 12/2	<i>Final Review Project: Subsurface Map #2</i> <i>Final Review Project: Marble Falls Geologic Map</i> 12/3: EXTRA CREDIT PROJECT DUE	
XVI: 12/7	12/7, 10:30 – 12:30 am: FINAL EXAM (comprehensive)	

Course Expectations

- 1) You will attend every class meeting, unless you are sick. Do not come if sick! If you cannot attend, borrow notes from classmate, fill in Powerpoint outline with notes from texts, and ask Dr. Joe questions.
- 2) You will take the next big step: let's talk outside of class about almost anything. Topics I like to discuss: geology, hiking and backpacking trails, productive ways of learning geology, racquetball, Lord of the Rings and Dark Tower, future careers, lame jokes, and more.
- 3) You will not distract yourself or others with electronic devices in class. *You will put your phone away during class.* During lab, you will step outside the room if you must text or take a call. Penalties: a) Friendly warning for forgetting the first two times, b) After the third time, you will be asked to leave the class.
- 4) Homework projects submitted after the due date will receive a 10-point deduction. Work cannot be turned in after the lab or assignment is returned to others (professional ethics issues). Exceptions will be made for serious illnesses, injuries, or family emergencies that require missing many classes.

Geoscience Careers

See Geoscience BS requirements in the [Angelo State Catalog](#)³. 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](#)⁴ contains information on geology careers, salaries, education needed, and future job outlook in geology.

GEO, the student organization for all interested in geology, meets Wednesdays at 6:00 pm. The first meeting

will be September 4. GEO is a Student Chapter of the [American Association of Petroleum Geologists](#)⁵.

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 lab assignment grade. The tentative schedule:

1. *Archaeology Fair and Elementary School Science Nights*: Saturday in September at Fort Concho (Archaeology Fair) and evenings to be announced (Science Nights). Opportunities for sharing basics of rocks, fossils, and maps with students, their parents, and interested people of all ages.
2. *Kickapoo Cavern*: Saturday, October 26. This field trip will head to the Kickapoo Cavern to explore a wild cave. There are no trails in the cave, so you must be sure-footed. We will be led by a cave guide and shown the wonders of a dead cave of historical significance. Leaders:
3. *Big Bend National Park*: Friday-Sunday, November 19 – 21. Physical Geology field trip to Big Bend National Park: hike and sketch Cretaceous stratigraphy in Santa Elena Canyon, describe Tertiary volcanic rocks in Tuff Canyon, hike to the top of the Lost Mine Trail in the Chisos Mountains. Leaders: Joe Satterfield,
4. *Favorite San Angelo Area Outcrops*: Saturday, December 4. We will meet early in the morning and return in the mid-afternoon. We will visit little-known outcrops just north of San Angelo, including Rattlesnake Hill, Edith Spring, Spence Reservoir, and the Divide Roadcut. Leaders: Joe Satterfield,

Student learning outcomes

You will learn about rocks and minerals that make up Earth and the sometimes subtle and often destructive processes that shape it. You will learn and test fundamental concepts about meteorite impacts, volcanoes, earthquakes, river flooding, oil and gas resources, groundwater, and plate tectonics. Many examples will be from West Texas and western North America. Problem-solving techniques that you will learn and 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
- Get as much practice or experience as you can
- Carefully defend your thinking when answering questions.
- Learning outcomes will be evaluated by exams and homework assignments

Core Curriculum Objectives and related ASU Student Learning Outcomes

Student Learning Outcome	Assessment Method
1. Gather, analyze, evaluate, and synthesize information relevant to a question or issue.	Lab Quiz
2. Develop, interpret, and express ideas through effective visual communication.	Lab Assignment
3. Manipulate and analyze numerical data and arrive at an informed conclusion	Homework/In-class Assignment
4. Manipulate and analyze observable facts and arrive at an informed conclusion	Average Lab Grade
5. Work effectively with others to support and accomplish a shared goal.	IDEA Forms

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 university's [Statement of Academic Integrity](#)⁶.

Policy for this course: first offense- zero on exam or homework, 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](#)⁷

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](#).⁸ The employee charged with the responsibility of reviewing and authorizing accommodation requests is:

Dr. Dallas Swafford

Director of Student Disability Services, Office of Student Affairs

325-942-2047

dallas.swafford@angelo.edu

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](#)⁹ 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](#)¹⁰ for more information.

Title IX at Angelo State University

Angelo State University is committed to providing and strengthening an educational, working, and living environment where students, faculty, staff, and visitors are free from sex discrimination of any kind. In accordance with Title VII, Title IX, the Violence Against Women Act (VAWA), the Campus Sexual Violence Elimination Act (SaVE), and other federal and state laws, the University prohibits discrimination based on sex, which includes pregnancy, and other types of Sexual Misconduct. Sexual Misconduct is a broad term encompassing all forms of gender-based harassment or discrimination and unwelcome behavior of a sexual nature. The term includes sexual harassment, nonconsensual sexual contact, nonconsensual sexual intercourse, sexual assault, sexual exploitation, stalking, public indecency, interpersonal violence (domestic violence or dating violence), sexual violence, and any other misconduct based on sex.

You are encouraged to report any incidents involving sexual misconduct to the Office of Title IX Compliance and the Director of Title IX Compliance/Title IX Coordinator, Michelle Miller, J.D. You may submit reports in the following manner:

Online: [Incident Reporting Form](#)¹¹

Face to Face: Mayer Administration Building, Room 210

Phone: 325-942-2022

Email: michelle.miller@angelo.edu

Note, as a faculty member at Angelo State, I am a mandatory reporter and must report incidents involving sexual misconduct to the Title IX Coordinator. Should you wish to speak to someone in confidence about an issue, you may contact the University Counseling Center (325-942-2371), the 24-Hour Crisis Helpline (325-486-6345), or the University Health Clinic (325-942-2171).

For more information about resources related to sexual misconduct, Title IX, or Angelo State's policy please visit the [Title IX website](#).¹²

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.

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](#)¹³
- [Angelo State University Catalog](#)¹⁴

Information About COVID-19

Please refer to ASU's [COVID-19 \(Coronavirus\) Updates](#)¹⁵ web page for current information about campus guidelines and safety standards as they relate to the COVID-19 pandemic.

Modifications to the Syllabus

This syllabus, including grade evaluation and course schedule, is subject to modification on potentially short notice based on developing circumstances.

¹ <https://digital.wwnorton.com/earth6>

² <https://blackboard.angelo.edu>

³ <https://www.angelo.edu/catalogs/>

⁴ <https://www.bls.gov/ooh/life-physical-and-social-science/print/geoscientists.htm>

⁵ <https://www.aapg.org/students>

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/services/disability-services/>

⁹ <https://www.angelo.edu/content/files/14206-op-1019-student-absence-for-observance-of>

¹⁰ <https://www.angelo.edu/content/files/14197-op-1011-grading-procedures>

¹¹ <https://www.angelo.edu/incident-form>

¹² <https://www.angelo.edu/title-ix>

¹³ <https://www.angelo.edu/student-handbook/>

¹⁴ <https://www.angelo.edu/catalogs/>

¹⁵ <https://www.angelo.edu/covid-19/>