TR 9:30 GEOL 1303: PHYSICAL GEOLOGY LECTURE, FALL 2021

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 and lab
*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

Required Textbook
- If used textbook: purchase SmartWork5 for Earth Portrait of a Planet at [Smartwork5 Access](#)

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, illustrated report about a scientific paper on a geology topic of your own choosing. Details provided after Exam 1.

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.
<table>
<thead>
<tr>
<th>Week</th>
<th>Lecture/Discussion Topics</th>
<th>Assigned reading before class</th>
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</table>
| I: 8/24, 8/26 | Flipgrid introductions  
Journey to the center of Earth (Ch 1, 2)  
Patterns in Nature: Minerals (Ch 5)  
Project: Minerals under ultraviolet light | Chapter 1: p. 23, 34 – 37  
Chapter 2: p. 51 – 63  
Chapter 5: 120 – 124 |
| II: 8/31, 9/2 | Project: Discovering Plate Boundaries, Part 1 (Ch 4)  
Project: Discovering Plate Boundaries, Part 2  
9/2: HOMEWORK 1 DUE | Chapter 4: p. 91 – 113 |
| III: 9/7, 9/9 | Project: Discovering Plate Boundaries, Part 3 (Ch 4)  
Magma and igneous rocks (Ch 6) | Chapter 6: p. 161 – 163, 169 – 180 |
| IV: 9/14, 9/16 | Project: calculating Enchanted Rock surface area  
| V: 9/21, 9/23 | 9/21: HOMEWORK 2 DUE  
Metamorphic Rocks (Ch 8)  
Review games to prepare for Exam 1 | Chapter 8:  
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) |
| VI: 9/28, 9/30 | 9/28: EXAM 1: Chapters 1, 2, 4, 5, 6, 7, and 8  
9/30: Geologic Maps (Ch 7, Ch 12) | Chapter 7:  
p. 224, 226 (formations)  
Chapter 12:  
p. 459-461 (formations, strat columns)  
p. 462-464 (geologic maps)  
p. 464-466, 476-479 (geologic time scale) |
| VII: 10/5, 10/7 | HW2, Project: Introduction to Edwards Plateau geology  
The Wrath of Vulcan: Volcanic Eruptions (Ch 9)  
Project: Constructing 3-D volcano models | Chapter 9:  
p. 280-290 (products of eruptions)  
p. 290-297 (types of volcanoes)  
p. 300-301 (Infamous eruptions)  
p. 308-311 (volcanic hazards) |
| VIII: 10/12, 10/14 | A Violent Pulse: Earthquakes (Ch 10)  
Project: Locating Earthquake epicenters  
10/14: HOMEWORK 3 DUE | Chapter 10:  
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)  
Project: Constructing block diagrams of structure | Chapter 11:  
p. 396 (stretching, shortening, shearing)  
p. 400 -401 (Box 11.1: Strike and dip)  
p. 405-408 (fold types) |
| X: 10/26, 10/28 | Mountain Building (Ch 11, p. 379)  
Project: Fault games with wood blocks  
Project: Viewing mountains in 3-D  
10/23: Review Games (Ch 11), HOMEWORK 4 DUE | Chapter 11 (continued):  
p. 397-404 (foints, fault types)  
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)  
Bronte Oil Field Project | Chapter 14:  
p. 529-532 (characteristics of source beds,  
reservoirs, seals; trap types) |
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 lecture or lab. You will put your phone away during class and lab. 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 lab or 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. 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 Wednesdays at 6:00 pm. The first meeting will be September 4. GEO is a Student Chapter of the American Association of Petroleum Geologists.
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.

**Core Curriculum Objectives and related ASU Student Learning Outcomes**

<table>
<thead>
<tr>
<th>Student Learning Outcome</th>
<th>Assessment Method</th>
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<tbody>
<tr>
<td>1. Gather, analyze, evaluate, and synthesize information relevant to a question or issue.</td>
<td>Lab Quiz</td>
</tr>
<tr>
<td>2. Develop, interpret, and express ideas through effective visual communication.</td>
<td>Lab Assignment</td>
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<tr>
<td>3. Manipulate and analyze numerical data and arrive at an informed conclusion</td>
<td>Homework/In-class Assignment</td>
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<tr>
<td>4. Manipulate and analyze observable facts and arrive at an informed conclusion</td>
<td>Average Lab Grade</td>
</tr>
<tr>
<td>5. Work effectively with others to support and accomplish a shared goal.</td>
<td>IDEA Forms</td>
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**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 to disciplinary action and possible expulsion from ASU. The College of Science and Engineering adheres to the university’s [Statement of Academic Integrity](#).

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](#).

**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](#). The employee charged with the responsibility of reviewing and authorizing accommodation requests is:
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](#) for more information.
Title IX at Angelo State University
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 Boone, J.D.
Director of Title IX Compliance/Title IX Coordinator
Mayer Administration Building, Room 210
325-942-2022
michelle.boone@angelo.edu
You may also file a report online 24/7 at www.angelo.edu/incident-form.

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 about Title IX in general you may visit www.angelo.edu/title-ix.¹⁰

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 Procedures¹¹ for more information.

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 Handbook¹²
- Angelo State University Catalog¹³

¹ https://digital.wwnorton.com/earth
² https://blackboard.angelo.edu
³ https://www.angelo.edu/catalogs/
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/services/title-ix/
¹¹ https://www.angelo.edu/content/files/14197-op-1011-grading-procedures
¹² https://www.angelo.edu/student-handbook/
¹³ https://www.angelo.edu/catalogs/