

GEOLOGY 3530 – SUMMER – May 19-30th, 2023
ADVANCED GEOLOGY OF THE COLORADO PLATEAU

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TEXT MATERIAL:

- *Blakey, Ron and Ranney, Wayne, 2008, Ancient Landscapes of the Colorado Plateau, Grand Canyon Association, Grand Canyon, Arizona.
- Hintze, Lehi F. and Kowallis, Bart J., 2009, Geologic History of Utah, Brigham Young University Geologic Studies, Provo, Utah.
- *Morris, Thomas H., Ritter, Scott M., and Laycock, Dallin P., Geology Unfolded, An Illustration to the Geology of Utah's National Parks.
- *Sprinkel, D.A., Chidsey, T.C., and Anderson, P.B., editors, 2001, Geology of Utah's Parks and Monuments, Utah Geological Association Publication No. 28, Salt Lake City, Utah.

Additional suggested references include:

- Baars, D. L., 2000, The Colorado Plateau, University of New Mexico Press, Albuquerque, New Mexico
- Baldrige, W. S., 2004, Geology of the American Southwest, Cambridge University Press, Cambridge, UK
- Barnes, F. A., 1993, Geology of the Moab Area, Canyon Country Publications, Moab, Utah.
- Doelling, H. H., 1985, Geology of Arches National Park (accompanies Map 74), Utah Geological and Mineral Survey, Utah Department of Natural Resources.
- Levin, H. L., 2003, The Earth through Time, 7th Ed., John Wiley and Sons.
- Stokes, W.L., 1986, Geology of Utah, Utah Museum of Natural History, University of Utah and Utah Geological and Mineral Survey, Department of Natural Resources, Salt Lake City, Utah.
- Wicander, R. and Monroe, J. S., 2013, Historical Geology, 7th ed., Brooks/Cole (Cengage Learning).

COURSE:

The Colorado Plateau is an area of spectacular geology and awe-inspiring beauty. Rocks that formed over a span of 1.84 billion years are now exposed in a desert environment. The course consists of 11 days of field lectures within the Colorado Plateau, including visits to Colorado National Monument, Zion National Park, Bryce Canyon, Capitol Reef National Park, as well as stops in Central Utah.

April 10th - Deposit due \$150

April 27th - 5:00-7:00 pm Kickoff Zoom Meeting

May 10th - Remaining trip fees due

May 13th - 12:00pm - In-Person Logistics/Gear Check

May 19-30th - On the Trip!

Jun 9th - 12:00pm - Student Poster Presentations and Debrief

OBJECTIVES:

1. To learn the most basic concepts of geology.
2. To learn basic geologic field methods.
3. To acquaint students with the geology of the Colorado Plateau ("the area").
4. To relate the geology of the area to the geology of the Colorado Front Range.
5. To identify the various geologic formations which are present in the area.
6. To understand the origin (depositional environments) of such formations, as well as the origin of various geomorphic features.
7. To understand the geologic history of the area.
8. To recognize various geomorphic features and understand their origins.
9. To learn the basic economic products associated with the area.

COURSE REQUIREMENTS:

Daily Participation and Discussions at Camp (5 points x 10 days = 50 points) - Students **must** attend and participate in the discussions throughout the trip. Be alert, engaged, inquisitive, and respectful

Field Notebook (5 points x 10 days = 50 points) - Students **must** take field notes and ask questions for clarification. Field notes should include objectives of the day, weather, location, technical conversations, measurements, sketches, and other learning or questions at each stop.

Geopuzzle Extra Credit (10 points) – This is an interesting topic or observation or measurement in the field that needs additional attention. Perhaps complicated faulting, or unconformable contact(s), strange sediment structures, or area of recreation or use that needs additional geologic attention. This must be specifically flagged in your field notebook as the “Geopuzzle” page. You must have a conversation with the trip leader(s) sometime during the camp about your geopuzzle. Document possible ways to understand it better; what type of data collection could be done, possible analogs, design lab experiments. How can the scientific method be applied to approach this geopuzzle?

Prepare Talking Point (Oral) (50 points) - Each GEL 3530 student will be given a specific talking point to be researched prior to the trip. They will become the “expert” on the topic during the trip. Students will be graded on their oral presentations during the trip. Share a figure, diagram, rock, picture, whiteboard sketch that will help the class understand your topic and why it is important for us during the trip.

Final Poster about your Talking Point (100 points) - After the trip is over, the student will create a poster on their talking point, incorporating additional knowledge and figures obtained during the trip. The poster must use a provided MSU template; with a professional quality that can be shown to others in future trips of this kind. Any material obtained from other sources **must** be properly referenced. As per departmental grading policies, plagiarism will result in a failing grade. Students will present their poster to the group at the post-trip meeting and feedback session tentatively scheduled for **Friday, Jun 9th, 12:00-2:00pm.** See grading rubric at the end of this document for more details about this poster assignment.

GRADING

Daily Participation and Discussions	50 pts
Field Notebook	50 pts (+10 extra credit?)
Talking Point in the field	50 pts
Final Poster	100 pts
	250 pts

After the total points for the semester are accumulated, the following scale will be used to assign letter grades. .

94-100%	= A	80-82.9%	= B-	65-69.9%	= D+
90-93.9%	= A-	77-79.9%	= C+	59-64.9%	= D
87-89.9%	= B+	73-76.9%	= C	55-58.9%	= D-
83-86.9%	= B	70-72.9%	= C-	below 55%	= F

FIELD TRIP:

Because we will be camping for 10 nights, preparing meals, and hiking a lot during our field lectures, every minute that you spend thinking and planning for this trip will be greatly rewarded in terms of comfort and ease of mind. It is your responsibility to be properly outfitted for this trip, including camping equipment and proper clothing. Camping equipment can be obtained from Campus Recreation, at a very reasonable cost.

Your non-refundable \$650 fees will cover your transportation, meals, camping fees, and entrance fees.

Enough water while hiking is critical....you will be in a desert! Do not waste water! Strenuous hiking is involved. We will give you a suggested checklist of supplies (separate from syllabus).

Do not litter! In fact, if you see any trash around our campsites, please pick it up and put it in a trash can or trash bag. **Always leave a campsite in better shape than when you arrived.** Last, but not least, be sure to **bring a camera!**

FIELD-TRIP WAIVER:

In order to participate in this course, students **must sign** a field-trip liability waiver. All students are under the professional responsibility concerning the consumption of alcohol, as well as impairing drugs and medications. **To keep all involved safe, a “no drinking” policy will be enforced for ALL students.** Smoking will only be permitted in designated areas. Because of eminent fire dangers in the many areas visited, absolutely NO smoking will be allowed during field hikes or outside designated areas. This includes but is not limited to throwing cigarette butts out of car windows. The instructors have the right to terminate any student found in violation of these responsibilities, and such actions will terminate him or her from continuing on the trip. The fees submitted will be non-refundable in such cases.

Poster Presentation

Become an expert on a formation or subject from the Colorado Plateau region
Create a summary Poster to present to the group

- **Poster Title, your name/email, and MSU Denver Logo** (5 pts)
- **What is the question you are trying to answer with this project?** (5 pts)
- **Who Cares? How is this formation relevant in the region or world?** (5 pts)
- **Background about the formation** (25 pts)
 - Current Geologic Map that shows the formation of interest around the region
 - Show where any core/outcrop data is available
 - Paleogeographic Map showing age/location/tectonics
 - Stratigraphic Column showing vertical position and age
 - Location Map with current geographic features labeled (might include major roads, lakes, rivers, towns etc., in other words where can we go to find a sample)
- **Environment of Deposition (EOD) diagram/what were the depositional conditions** (10 pts)
- **What is known/unknown about...** (25 pts)
 - Grain types, porosity, cement, diagenesis, distribution, recognition in field/lab
 - Thin Section photos and references
 - Hand Sample photos and references
 - Core Sample photos and references
 - Outcrop/Google Earth/Satellite photos and references
 - What analytical techniques are available/needed to answer the research question(s)?
- **References and Works Cited Summary** (10 pts)
- **Future work that could be done (beyond the scope of this project)** (5 pts)
- **Create a paper poster approximately 36 x 42 Inches and a 11x17 mini version of same** (5 pts)
- **A digital copy of the poster is required for the class archive** (5 pts)
- **Present this poster at the next Student Showcase**