

Geosciences Program, Department of Physical & Environmental Sciences
Summer Semester, 2019
GEOL480 – Summer Field Camp



Onion Creek Salt Diapir

Faculty Information

Instructors (this is a team taught course)	Dr. Rick Livaccari (Coordinator, Structure, Tectonics & Petrology) email: rlivacca@coloradomesa.edu Dr. Rex Cole (Sedimentology, Stratigraphy & Regional Geology) email: rcole@coloradomesa.edu Dr. Verner Johnson (Geophysics, Environmental Geology & GIS/GPS) email: vjohnson@coloradomesa.edu Dr. Cassie Fenton (Quaternary Geology & Isotopic Age Dating) email: cfenton@coloradomesa.edu
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Course Information

Class Time	May 20 – June 28 (including Memorial Day & some weekends)
Classroom	Off-campus Fieldwork
Prerequisites	GEOL 111/111L or GEOL 113/113L, GEOL 112/112L, GEOL 301/301L, GEOL 444/444L (recommended)
Credit Hours	6 credits
Contact Hours	40 hours per week

IMPORTANT: Please read this syllabus. You are responsible for being prepared for this course.

Course Catalog Description

This course involves basic training in field geology. Students will perform a variety of geologic mapping exercises using topographic maps and air photos. Students will gain an appreciation of geologic maps - how they are made, the uncertainties and unknowns in mapping, and how mappers deal with them. Most mapping exercises are in deformed sedimentary strata and Quaternary surficial deposits. The course is a six full weeks in duration, beginning immediately after conclusion of Spring Semester. Students should not expect to have weekends or holidays off. Students will also be camping out at least half the time or more during this course.

This course is not a summer vacation. Fieldwork is physically and mentally demanding for both you and your instructor. You will endure strenuous hikes, uncomfortable weather conditions (heat, wind, rain, snow) and biting gnats.

Because of these demands, a high degree of professionalism is expected from each student. A portion of the total grade is based on your attitude (cooperation and effort). This includes your ability to be cooperative and respectful of your fellow students the faculty member. Please refrain from any behavior that might be considered as 'sexual harassment'. Additionally, all rules and regulations regarding student conduct and performance as defined in the Colorado Mesa University Catalog will be enforced (including the alcohol and drug policy).

Student Fee:

In addition to the tuition cost for this course, there is also a **\$700** student fee. This money helps us pay for camping fees, van rentals and other material costs for this course.

Liability Release Form:

You must fill out and sign the Colorado Mesa University liability release form (last page of this syllabus).

Absences:

Absences cannot be tolerated. If you cannot attend class, do not enroll. Fieldwork cannot be made-up at another time. If you miss a day because of illness, you must present a faculty member with a confirmation note from a medical professional. In this case, your absence may be excused and no points will be deducted. Other emergency absences will be evaluated on an individual basis. Documentation of the emergency will be required. **Students missing three or more days of fieldwork, regardless of the cause, will be dismissed from the course.**

Preexisting Medical Conditions:

Please provide your instructor with information regarding any preexisting medical conditions that may cause problems in the field.

Drugs and Alcohol:

The CMU Board of Trustees prohibits the possession, use, or distribution of illicit drugs and alcohol by students and employees on the property or as part of the activities of the College. The fieldwork and the time spent camping out for this course are considered activities of the College. Any student caught violating this policy will be dismissed from this course.

Firearms:

Possession of firearms and other weapons are prohibited in the field or in camp.

Non-Student Participants:

There can be no participation of friends, spouses, children, family members, and pets in field camp. This includes evening campouts.

Use of College Vehicles:

Throughout the camp, Colorado Mesa University vans will be provided for transportation. CMU vehicles cannot be used to transport any of the following: (1) alcohol, (2) illegal drugs, (3) firearms, (4) pets, and (5) non-students. In addition, drivers of CMU vehicles cannot partake in consumption of alcoholic beverages prior to, or while driving.

Accessing the Field Areas:

The class will leave for each day's fieldwork as a group and return as a group. Prior to the start of field camp, we will make arrangements to allow some students to use their personal vehicles for this course. These personal vehicles can only be used to facilitate this course such as accessing the field area. Students are not allowed to leave the field camp on their own in personal vehicles.

Fieldwork start times will be announced by the instructor. You must be punctual. The entire class cannot wait for a late student. We will generally start work between 7 and 8am, and end between 4 and 5 pm.

Camping:

We will be camping out during four weeks of this course. During those times, students will provide their own equipment, supplies, food, etc. (except for the river trip, see below). I strongly suggest teaming up to form 'cooperatives' for buying food and cooking meals. We will be staying in primitive BLM campgrounds with pit toilets and picnic tables, but no other amenities (including no water).

Safety:

Fieldwork is dangerous. Please be careful and use common sense. Do not place yourself in dangerous situations. The most significant dangers in the field are as follows:

- ✓ **Vehicle accidents:** While in the college vans, seat belts will be worn at all times.
- ✓ **Loose rocks:** Be careful of loose rocks that can dislodge, roll, &/or fall on people below. In case you dislodge a rock yell "rock, look out below." **No rock rolling or throwing.**
- ✓ **No earbuds or headphones while hiking.**
- ✓ **Climbing:** Stay out of precipitous areas and do not place yourself in a dangerous situation. When you have to climb a slope, avoid climbing directly above another person.
- ✓ **Foot and ankle injuries:** Wear appropriate footwear. Sandals and sneakers are not appropriate field gear and can cause sprained ankles and cut toes.
- ✓ **Snake bite and scorpions:** Watch where you step and place your hands, feet, head, and posterior.
- ✓ **Sunburn:** Wear a hat and use sunscreen. A bad sunburn on the first week of camp can be disastrous.
- ✓ **Eye protection:** Safety glasses, eyeglasses, or sunglasses should be worn at all times while in the field, especially when hammering on rocks.
- ✓ **Dehydration (see below)**

Accidents

In case of an accident, the first concern will be the welfare of the injured party. If you need medical attention, every effort will be made to get you to the hospital as quickly as possible. If an injury occurs, the other group members should immediately contact the faculty member in charge with the two-way radio.

Cell Phones

Many of our campsites will be outside of cell phone service. There could be stretches of time as long as 2-3 days when you will not be able to make cell phone calls. Cell phones may be charged from vehicles while the vehicles are being driven; there will be periods of time when your cell phone is dead and cannot be charged.

Dehydration:

In the past, the most significant health problem in the field has been dehydration. Drinking plenty of fluids is essential while working in hot conditions.

Dehydration is a serious problem and can be a life-threatening emergency. Mild dehydration results in heat cramps (muscle spasms in the arms, legs, or abdomen) and nausea (feels like food poisoning). Drinking fluids is sufficient to overcome mild dehydration. In addition to lack of water, mild dehydration is also related to loss of salt and other electrolytes. Common athletic drinks like Gatorade are useful in maintaining electrolyte balance. Heat exhaustion is a more profound loss of water and electrolytes. It causes weakness, headache, dizziness, low blood pressure, elevated pulse, and fever-like temperature elevation. Both forms of dehydration can be treated by moving out of the sun, drinking fluids, and eating salty food.

You must have at least four liter-size, sturdy water bottles for carrying water in the field (one gallon/day/person is the general rule).

Mapping Groups & Academic Honesty:

Students will work in groups. These groups will be determined by the faculty member. This is mainly for safety purposes. Students will be graded individually. **It is assumed that all work handed in represents your own geological thinking.** Each student is expected to make their own map and take their own field notes when in the field. You are encouraged to discuss your field interpretation and notes with your teammates, but ultimately, you must do your own work. Students that simply copy another teammate's notes or field map will be considered cheating. Please understand that your instructor can recognize students that are not fully applying themselves. Indolent students will have points deducted from the 'Attitude' portion of their grade.

Grading:

Grades are based on the following:

- ✓Project Reports (maps, cross-sections, stratigraphic sections, figures, field notebook)
- ✓Attitude in the Field (professionalism, cooperation, preparedness & effort)


All documentation (notebooks, maps, cross sections, diagrams, etc.) should be done neatly and precisely. Your instructors cannot tell the difference between sloppy drafting or note taking and lack of understanding. Sloppy work will be treated as a lack of understanding and graded accordingly.

Mandatory Field Mapping Equipment:

Please buy this equipment before the course begins. You will not be prepared to map and you will lose points from your grade if you do not have this mapping equipment. You can buy this equipment individually or purchase a package from the Real Science Innovations website (Standard Field Geology Kit for \$159.00).

<https://www.realscienceinnovations.com/field-geology-kits.html>



1. **Field notebook:** You will need one new field notebook. The least expensive ones are found in the Colorado Mesa University bookstore, they carry the Ben Meadows 'Level book' (for \$12). You can get them even cheaper, directly from Ben Meadows (<http://www.benmeadows.com>). There really is no need for the more expensive 'Rite in the Rain Geologic Field Book'.
2. **Map Board (12 x 14½"):** Base maps are too large for 8½ by 11" clipboards. You can make a map board from ¼-inch thick particleboard. You can also purchase a paint board at Hobby Lobby for \$10 (paint boards are white on one side, and are lighter and thinner than particleboard). It is recommended that you drill holes near two of the corners. Insert a thin piece of rope into these holes and use a small carabineer to clip the map board to your belt. This way you do not actually need to hold it all day, which gets tiring. You could also purchase the 11x14" Hinged Plexiglass Map Board (\$21.00) at Real Science Innovations (URL above).
3. **Belt Pouch & Belt:** It is not a good idea to carry pencils in your pockets. They will poke holes in the bottom of your pocket and fall out. Also, without a belt pouch to hold it, notebooks can be easily lost (major disaster for you and your grade). Having a pouch to carry a notebook, pencils, pens, etc. or equivalent, such as a field vest is a great assistance to you in the field (in the CMU bookstore).
4. **White Plastic Erasers:** Get several; they are essential and easy to lose. Get the white plastic erasers; not the abrasive pink or green ones, they will mess up your maps and notebooks.
5. **0.5mm Mechanical Pencils:**  You will need more than one, they are easy to lose. Do not use the standard 2B leads, they are too soft and will smear. Instead, use 2H lead.
6. **Protractor & ruler:** Get at least two of each, if you lose them, you cannot map, and they are cheap.
7. **CamelBak or water bottles:** enough to carry a gallon of water.

Recommended Field Mapping Equipment to carry with you in the field everyday:

- ✓ **Sturdy Backpack:** capable of holding raingear, a gallon of water, neat rocks, sunscreen, lunch, personal first-aid kit, etc.
- ✓ **Lunch & Snacks**
- ✓ **Hat & Sunscreen:** don't let the sun fry your head, you may need your brain to do the geology
- ✓ **Insect Repellent:** the bugs can drive you nuts!
- ✓ **Sturdy, broken-in Boots:** Not sandal's; they are OK for end of day.
- ✓ **Gaiters:** to keep the cheat grass out of your socks, this can also drive you nuts!
- ✓ **Rain Gear:** light weight and very waterproof, you can get caught in the rain far from camp or the van
- ✓ **Watch** ⌚
- ✓ **Hand lens:** (10X)
- ✓ **Geologists Hammer, Acid bottle & Safety Glasses:** sunglasses 🕶 are OK
- ✓ **Grain-size card for Sedimentary Rocks**
- ✓ **Small metal clips & rubber bands for your map board**
- ✓ **Compass:** We have some that you can check out, so you do not need to buy one. Please understand that if you lose or damage one of the Geoscience Program's compasses that you are financially responsible. If you prefer to have your own the following are recommended: Suunto MC2D/MM Azimuth (\$50 at bookstore), or Silva Ranger CL15 azimuth (\$55 at REI), or if you can afford it, Brunton Pocket Transit-Azimuth (\$226 at benmeadows.com).
- ✓ **Two-way radios:** We have some but you are welcome to get your own.
- ✓ **Garmin GPS with the Colorado-Utah topographic maps 24k microSD chip:** We have some that you can check out.
- ✓ **Regular Pencils** ✎ (2H leads, for back-up)

Recommended Field Mapping Equipment to keep in Camp:

- ✓ **Color Pencils:** about a dozen different colors ✎✎✎✎✎✎✎✎ to color your map
- ✓ **Graph paper:** 10 squares to the inch is best for making cross-sections
- ✓ **Triangle:** drawing
- ✓ **Inexpensive Calculator:** not a good one that would cost a lot to replace in case you break it
- ✓ **Adhesive Tape**
- ✓ **scissors** ✂: for cutting basemaps
- ✓ **pencil sharpener:** for those colored pencils

Personal Camping equipment

Bring these things along for the camping parts of the course.

- ✓ 5 gallon water container (for primitive camping)
- ✓ Flashlight 🔦
- ✓ Jackets, long underwear, gloves: Stuff to keep you warm, in case it gets cold...
- ✓ Tent: a good one that is waterproof and can withstand windy conditions
- ✓ Sleeping Bag & Sleeping Pad
- ✓ Other personal items such as towel & toothbrush, etc
- ✓ Toilet Paper and Sanitation Trowel for digging cat holes
- ✓ ice cooler (except for the river trip, where this will be provided)
- ✓ stove, lanterns & fuel
- ✓ pocket knife
- ✓ folding chair (very nice at the end of the day)
- ✓ first aid kit (small, personal)
- ✓ sunglasses 🕶
- ✓ cooking gear/personal eating gear (except for the river trip, where all of this will be provided)
- ✓ pillow (a great luxury)
- ✓ camera (for all the fond memories)

MAY & JUNE 2019, TENTATIVE FIELD CAMP SCHEDULE

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
May 19	20 Local mapping in CNM; leave at 7:45am from CP13 (RL)	21 Local mapping in CNM (RL)	22 Local mapping in CNM (RL)	23 Local mapping in CNM (RL)	24 Mineral Collecting in Unaweep Canyon (RL)	25
26	27 (Memorial Day) Leave for Onion Creek Campground A (RL)	28 Onion Creek Project (RL)	29 Moab Fault Project (RL)	30 tour of UMTRA, finish Moab Fault Project (RL)	31 River float, Moab Daily RL	June 1
2 Leave for, Kanab, UT at 7:30am in CP9 parking lot	3 Quaternary geology of Kanab, UT (KR)	4 Quaternary geology of Kanab, UT (KR)	5 Quaternary geology of Kanab, UT (KR)	6 Quaternary geology of Kanab, UT (KR)	7 Quaternary geology of Kanab, UT (KR)	8
9	10 Leave for Henry Mts. Meet at 7:30am in CP13 parking lot, camp at Starr Springs campground (VJ)	11 Henry Mts. project; (VJ)	12 Henry Mts. project (VJ)	13 Henry Mts. project (VJ)	14 Return to GJ, will make few stops (VJ)	15
16 Leave for, Flagstaff, AZ at 7:30am in CP9 parking lot	17 fieldwork in the Flagstaff, AZ area (CF)	18 fieldwork in the Flagstaff, AZ area (CF)	19 fieldwork in the Flagstaff, AZ area (CF)	20 Camp at south rim of Grand Canyon Flagstaff, AZ area (CF)	21 Drive back to GJ (CF)	22
23	24 Meet at 7:30am WS-154 for project introduction. (RC)	25 Local field work on Dakota Fm. (RC)	26 Local field work on Dakota Fm. (RC)	27 Local field work on Dakota Fm. (RC)	28 Local field work on Dakota Fm. (RC)	29



Physical & Environmental Sciences Department

WAIVER, RELEASE, ASSUMPTION OF RISK, AND INDEMNIFICATION AGREEMENT

Course: _____ Term/Year: _____

Activity (if applicable): _____

Instructor: _____

Student/Participant Name: _____ Student ID Number: _____

In consideration of the State of Colorado, Colorado Mesa University and its **Physical & Environmental Sciences Department** granting me permission to participate in the above-referenced course and/or activity, and with the understanding that such participation is conditioned upon my execution of this waiver and release, for myself, my heirs and assigns, I hereby acknowledge, recognize and assume the risks involved in the course and/or the activity and any risks inherent in any other activities connected with the course and/or activity in which I may voluntarily participate. I expressly assume the risk of and accept full responsibility for any and all injuries (including death) and accidents which may occur as a result of my participation in the course and/or activity and release from liability the State of Colorado, Colorado Mesa University and its **Physical & Environmental Sciences Department**, and all of the officers, directors, agents, representatives, and employees of the foregoing entities.

I HEREBY WAIVE ANY CLAIM I MAY HAVE AS A RESULT OF MY PARTICIPATION IN THE ABOVE-REFERENCED COURSE AND/OR ACTIVITY. I HEREBY AGREE TO INDEMNIFY, DEFEND AND HOLD HARMLESS THE STATE OF COLORADO, COLORADO MESA UNIVERSITY AND ITS CORPORATE EDUCATION CENTER, AND ALL OF THE OFFICERS, DIRECTORS, AGENTS, REPRESENTATIVES, AND EMPLOYEES OF THE FOREGOING ENTITIES AGAINST ANY AND ALL CLAIMS, INCLUDING ATTORNEYS' FEES AND COSTS, WHICH MAY BE BROUGHT AGAINST ANY OF THEM BY ANYONE CLAIMING TO HAVE BEEN INJURED AS A RESULT OF MY PARTICIPATION IN THE COURSE AND/OR ACTIVITY.

This waiver shall be governed in accordance with the laws of the State of Colorado, and venue for any action related to this waiver shall be in the City and County of Denver, Colorado. This waiver is intended as the complete integration of all understandings between the parties. No prior or contemporaneous addition, deletion, or other amendment hereto shall have any force or effect whatsoever, unless embodied herein in writing.

THIS IS A RELEASE OF LIABILITY. IF STUDENT IS UNDER EIGHTEEN (18) YEARS OF AGE, SIGNATURE OF A PARENT OR GUARDIAN IS REQUIRED. I HEREBY CERTIFY THAT I HAVE READ AND FULLY UNDERSTAND THIS WAIVER, RELEASE, ASSUMPTION OF RISK AND INDEMNIFICATION AGREEMENT.

Signature of Student/Participant

Date

Signature of Parent (if participant is under 18 years of age)

Date