

GY480 Field Geology Course

Last Update: January 30, 2012

I. Course

GY480 Field Geology

II. Catalogue Description

A six-week, summer field course on the methods of geologic surveying, the construction and analysis of geologic maps and cross-sections, measurement of stratigraphic sections, and hydrogeologic mapping. Prerequisites: HS170 (First Aid), GY301 (Applied Geomorphology), GY303 (Igneous & Metamorphic Petrology), GY304 (Stratigraphy), GY402 (Sedimentary Petrology), GY403 (Structural Geology); or permission of instructor.

III. Course Objectives

The main objectives of the field course are to provide the student with the following skills:

1. Map location with pocket transit and GPS, including triangulation with topographic maps.
2. Basic map location techniques with the pocket transit and topographic map (hand-leveling, triangulation, etc.).
3. Topographic and geologic survey techniques with the pocket transit/GPS.
4. Geologic field mapping and structural analysis in a polydeformed metamorphic and igneous terranes, and folded to undeformed sedimentary rocks.
5. Measurement of stratigraphic section and construction of stratigraphic columns with detailed description.
6. Construction of geologic cross-sections.
7. Hydrogeologic measurements and mapping, including safety procedures and certification.

IV. Course Topics

Travel Schedule from Mobile

The course begins on the Monday after spring semester commencement. The field camp van(s) leave the Life Sciences building at 7:00 AM on the Sunday after commencement to travel to Ink's Lake State Park in the vicinity of Llano, Texas. Travel time is approximately 12 hours. Instruction will begin at 8:00 AM on the following Tuesday. Monday is used by the instructors to set up the Total Station mapping project.

The weekly work schedule will be full work days Monday through Friday with a half day on Saturday. Sundays will be off days for washing clothes and cleaning up the camp

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site. If we are rained out during the week we may be forced to work full days on Saturday and Sunday. A typical work day will consist of leaving for the field at 7:30 AM and arriving back at camp at approximately 5:00 PM.

Below is a tentative schedule of projects:

Day 1-5: Cheaha State Park 1:12,000 Geologic Map & Cross Section Project (Cheaha State Park, AL).

Day 6-9: Return to Mobile on Day 6; Turn in Cheaha Project on Day 9.

Day 10-18: Inks Lake State Park & Murchison Ranch 1:12,000 Geologic Map and Cross-section, TX, Project.

Day 19: Travel to and camp at Palo Duro State Park, TX.

Day 20-27: Copper Hill NM 1:12,000 Geologic Map and Cross-Section

Day 28: Wheeler Peak (elevation = 13,161 feet)

Day 29: Inks Lake Project Due

Day 30-31: San Ysidro 1:12,000 Geologic Map and Cross-Section

Day 32: Copper Hill Project Due; Cleanup and packing

Day 33: Travel from Taos Ski Valley to Burnet TX (Motel)

Day 34: Travel from Burnet TX to Mobile AL

Required Equipment

a) Required Field Equipment

1. [Day pack](http://www.rei.com/product/827133/rei-trail-25-pack) (<http://www.rei.com/product/827133/rei-trail-25-pack>)
2. [Rock pick](http://www.forestry-suppliers.com/product_pages/View_Catalog_Page.asp?mi=3143&title=Estwing+Long+Handle+Rock+Pick) (http://www.forestry-suppliers.com/product_pages/View_Catalog_Page.asp?mi=3143&title=Estwing+Long+Handle+Rock+Pick)
3. "Sharpie" Thick Marker pen for marking rock samples
4. [Colored pencils](http://www.amazon.com/Verithin-Colored-Woodcase-Pencils-Assorted/dp/B001GXE2VS/ref=cm_cr_pr_product_top) (http://www.amazon.com/Verithin-Colored-Woodcase-Pencils-Assorted/dp/B001GXE2VS/ref=cm_cr_pr_product_top)
5. [Drawing pencil \(0.5mm HB, 2H lead\)](http://www.forestry-suppliers.com/product_pages/View_Catalog_Page.asp?mi=) (http://www.forestry-suppliers.com/product_pages/View_Catalog_Page.asp?mi=

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8245&title=Alvin+Draft/Matic+Mechanical+Pencils)

6. [All weather Rite-in-Rain Pen](#)

(http://www.forestry-suppliers.com/product_pages/View_Catalog_Page.asp?mi=5727&title=Rite+in+the+Rain+All-Weather+Pens)

7. [All Weather Rite-in-Rain Notebook](#) (NOTE: get 2 for GY480)

(http://www.forestry-suppliers.com/product_pages/View_Catalog_Page.asp?mi=7853&title=%E2%80%9CRite+in+the+Rain%E2%80%9D%C2+Geology+Field+Book+with+Reference)

8. [Hand lens](#)

(http://www.amazon.com/BAUSCH-LOMB-Hastings-Triplet-Magnifier/dp/B0011GINQU/ref=sr_1_2?ie=UTF8&qid=1327465583&sr=8-2)

9. [Protractor](#)

(http://www.forestry-suppliers.com/product_pages/View_Catalog_Page.asp?mi=5938&title=Protractors+and+Circles)

10. [8.5" x 11" vellum](#)

11. Calculator (with trig functions)

12. [Engineer's Scale](#)

13. Stereonet, equal-area, 3.5 inch radius mounted on cardboard or plywood with tack.

14. Several push-pins for marking stations on maps

15. Bottle of dilute HCl acid (steal some from room 335)

16. Pocket knife (hardness test)

17. [Drafting dots tape](#)

(http://www.amazon.com/Commercial-Office-Supply-Div-Products/dp/B004E3O6Z4/ref=sr_1_18?s=office-products&ie=UTF8&qid=1327460849&sr=1-18)

18. [Pigment Liner Pen set](#)

(http://www.forestry-suppliers.com/product_pages/View_Catalog_Page.asp?mi=7130&title=Staedtler+Pigment+Liners)

19. [Drafting board](#)

(http://www.amazon.com/Helix-Drawing-Board-inches-37182/dp/B003LQQ3O2/ref=cm_cr_pr_product_top)

20. [Clipboard](#) (measuring srike & dip)

(http://www.forestry-suppliers.com/product_pages/View_Catalog_Page.asp?mi=1167&title=Neon+Clipboard)

b) Optional Equipment (not required but "nice" to have)

1. [Binoculars](#)

(http://www.forestry-suppliers.com/product_pages/View_Catalog_Page.asp?mi=7078&title=Brunton+Echo+Binoculars)

2. [Crack hammer](#)

(http://www.forestry-suppliers.com/product_pages/View_Catalog_Page.asp?mi=3147&title=Estwing+Crack+Hammers)

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3. [Chisel](#)

(http://www.forestry-suppliers.com/product_pages/View_Catalog_Page.asp?mi=3155&title=Estwing+Rock+Chisels)

4. Digital Camera

5. Pocket Transit (all of the below can measure strike & dip of planes or bearing & plunge of lines)

[GEO International](#) (the ultimate!)

(http://www.forestry-suppliers.com/product_pages/View_Catalog_Page.asp?mi=7084&title=Brunton+GEO+International+Geological+Structural+Transit)

[Standard Pocket Transit](#) (azimuth)

(http://www.forestry-suppliers.com/product_pages/View_Catalog_Page.asp?mi=1310&title=Brunton+Pocket+Transits)

[70M Mirrored Compass](#)

(http://www.forestry-suppliers.com/product_pages/View_Catalog_Page.asp?mi=7926&title=Brunton%C2+70M+Professional+Mirrored+Compass)

[Silva Ranger](#)

(http://www.forestry-suppliers.com/product_pages/View_Catalog_Page.asp?mi=1296&title=Silva+Ranger+Compass+with+Built-In+Clinometer)

5. [Garmin Dakota 20 GPS](#)

(http://www.forestry-suppliers.com/product_pages/View_Catalog_Page.asp?mi=7280&title=Garmin+Dakota+Series)

6. [Garmin US 1:100,000 microSD base map](#) (Works with Dakota 20 GPS)

(http://www.forestry-suppliers.com/product_pages/View_Catalog_Page.asp?mi=4584&title=Garmin+Topo+100K+on+microSD)

7. Laptop computer

c) Required Personal Field and Camp Equipment

1. [Camelback](#) or similar hydration pack

(http://www.forestry-suppliers.com/product_pages/View_Catalog_Page.asp?mi=8132&title=CamelBak%AC+HydroBak+Water+Pack)

2. [Hat with brim](#)

(http://www.forestry-suppliers.com/product_pages/View_Catalog_Page.asp?mi=8713&title=Helios+Sun+Hat)

3. [DEET insect repellent](#)

(http://www.forestry-suppliers.com/product_pages/View_Catalog_Page.asp?mi=6558&title=Controlled+Release+Lotion)

4. [Personal first-aid kit](#)

(http://www.forestry-suppliers.com/product_pages/View_Catalog_Page.asp?mi=3616&title=First+Aid+Travel+Kit)

5. [Thermarest pad or equivalent.](#)

(http://www.forestry-suppliers.com/product_pages/View_Catalog_Page.asp?mi=6078&title=Ridge+Rest+Foam+Cell+Sleeping+Pad)

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6. Tents (Below are models that have performed well for me or friends)
 - [Eureka Tetragon 4-person](http://www.forestry-suppliers.com/product_pages/View_Catalog_Page.asp?mi=7897&title=Eureka%21%C2+Tetragon+4+Tent)
(http://www.forestry-suppliers.com/product_pages/View_Catalog_Page.asp?mi=7897&title=Eureka%21%C2+Tetragon+4+Tent)
 - [Kelty Gunnison 2-person Backpacking Tent](http://www.rei.com/product/796133/kelty-gunnison-21-tent)
(<http://www.rei.com/product/796133/kelty-gunnison-21-tent>)
 - [Kelty Grand Manan Tour 5 person with vestibule screen room](http://www.campmor.com/outdoor/gear/Product___27900#)
(http://www.campmor.com/outdoor/gear/Product___27900#)
7. Enough clothing for 6 days of field work. Clothing should be light weight cotton shirts, jeans, or shorts that are appropriate for hot weather. Bring 2 pairs of jeans and warm long-sleeve shirts for cold nights at Taos Ski Valley and Grand Canyon. You should have a warm fleece-type jacket with a waterproof (GorTex recommended) outer shell rain jacket that can be worn over the fleece.
8. Boots with ankle support. Use thick wool hiking socks with nylon sock liners to avoid blisters. Bring water shoes for stream crossings.
9. Towels for tent camping days (none are supplied by the campgrounds)
10. [Camp mess kit](http://www.campmor.com/outdoor/gear/CAMOmniFindQueryCmd?storeId=226&catalogId=40000000226&langId=-1&searchCategory=&ip_state=&ip_constrain=&ip_navtype=search&pageSize=24¤tPage=&ip_sortBy=&searchKeywords=21222-Q)
(http://www.campmor.com/outdoor/gear/CAMOmniFindQueryCmd?storeId=226&catalogId=40000000226&langId=-1&searchCategory=&ip_state=&ip_constrain=&ip_navtype=search&pageSize=24¤tPage=&ip_sortBy=&searchKeywords=21222-Q)
11. Juice/Coffee mug
12. [Eating utensils](http://www.campmor.com/outdoor/gear/CAMOmniFindQueryCmd?storeId=226&catalogId=40000000226&langId=-1&searchCategory=&ip_state=&ip_constrain=&ip_navtype=search&pageSize=24¤tPage=&ip_sortBy=&searchKeywords=23101-Q) (knife/spoon/fork comb)
(http://www.campmor.com/outdoor/gear/CAMOmniFindQueryCmd?storeId=226&catalogId=40000000226&langId=-1&searchCategory=&ip_state=&ip_constrain=&ip_navtype=search&pageSize=24¤tPage=&ip_sortBy=&searchKeywords=23101-Q)
13. These items will mitigate the effects of the high-altitude arid climate in NM & TX: saline nasal spray, lip balm, Vaseline skin lotion.
14. Because of the many miles of hiking and the “less than perfect” cleanliness of campground restrooms and showers you will more than likely need foot powder and anti-fungal foot lotion. The foot powder will also keep you boots from developing “unwanted” odor.
15. [Headlamp](http://www.campmor.com/outdoor/gear/Product___73118) (for hands-free work at night)
(http://www.campmor.com/outdoor/gear/Product___73118)

Meals

You are responsible for these meals during the course:

Cheaha S.P. (Days 1-5): Student responsible for all meals.

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Break in Mobile; Prepare Cheaha Project (Days 6-9): Student responsible for all meals

Inks Lake (days 10-18): M-F breakfast and all weekend meals.

Travel to Palo Duro (Day 19), Travel to Taos Ski Valley (Day 20): Students are responsible for all meals.

Taos Ski Valley (AustingHaus Motel) (Days 21-32): no meals (Motel provides all meals)

Travel from Taos Ski Valley to Mobile: Students are responsible for all meals (Days 33-34)

The ES department will provide three Coleman propane stoves at the camp site. The department will also provide basic cooking implements such as skillets and pots, however, if you have special diet considerations please discuss them with the instructors several weeks prior to the start of the course. You will need to bring your own personal plate, utensils, Coffee mug, etc. We will make periodic trips to town for food and ice. You should be prepared to make a light breakfast in camp M-F. We will have lunch and dinner provided by the Hoover Valley Café M-F for the Inks Lake duration. Weekend meals will either be on the road or prepared at the campsite. Regardless of the meals you should make sure you have an ample supply of fluids at all times. The department will supply an ice chest that will be in the van at all times.

Transportation

You are responsible for your transportation to and from the Llano area unless you are designated for the van by your instructors. Places in the van are assigned on a "first-come" basis after the deposit for the course has been paid. The department van will be limited to 6 students (max seatbelt capacity). Additional rental/university vehicles may be used depended on enrollments/budget constraints. Deposits may be paid anytime after the Spring semester begins. I encourage anyone who wants to bring their private vehicle since the van will be crowded with people and equipment. For those that are riding in the van, you should meet with the instructors several days before the trip so that you know where and how your gear will be stored.

Although I encourage you to take your personal vehicles to the camp, in general I will not allow you to take you personal vehicles to the mapping sites during the field course. If you want to do extra field work on Saturdays or Sundays check with me first before traveling to the mapping site in your vehicle. For students who may choose to ride in a privately owned vehicle you should know that USA has no responsibility over that vehicle so you do so assuming all risks that are related to traveling in a privately owned vehicle.

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Rules

1. You will be assigned to groups when working on mapping projects. Do not wander off by yourself for any reason. You will work in groups so that if someone has an accident the other persons in the group can go for help. If I find that you have purposely left your group I will fail you for that project (I am serious about this rule). Part of this course is learning to work with others.
2. Respect the landowner's property. Don't tear down any fences or leave gates unlocked for any reason. Don't leave trash in the area. If I find that you have done this I will dock you a letter grade on the project.
3. Beware of, and obey all local laws, rules and park regulations. When you get to Ink's Lake State Park read the rules and regulations. If I see you doing something illegal I will warn you once. If any additional violations come to my knowledge I will advise the park rangers as to what is occurring and then you will be at their mercy. This also applies to the any time spent in motels. Most camp grounds have quiet hours posted from 10PM to 6AM. Texas State Parks prohibit public consumption of alcohol.
4. When climbing on outcrops never climb directly above another person. Serious injury may occur if you knock loose a boulder.
5. Wear eye protection when using a rock hammer.
6. Don't be late. I will assign departure times for the van each night. If you over-sleep you will be left at the camp site/Motel. Missing one day can easily cost you several letter grades on a mapping project. It also puts a burden on your group partner(s). You will not be allowed to copy your partners notes or map data unless you have a valid excuse for missing that day.
7. Buy a sheath for your rock hammer. I have seen unsheathed rock hammers cause very nasty wounds when fallen on.

V. Text

Compton, R.L., 1962, Manual of Field Geology, John Wiley & Sons, New York, 378 p.

VI. Procedure for Assessing Student Performance

Student performance will be assessed using the following point weighting:

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Item	Points out of 100 total points
Field Notebook	5
Presentation	5
Cheaha State Park, AL, Project	15
Ink's Lake State Park, TX, Project	20
Box Canyon/Copper Hill, New Mexico, Project	20
San Ysidro, NM, Project	15
Hydrogeologic Mapping Project	10
Subjective (motivation, attitude, working with others, etc.)	10
TOTAL	100

The subjective portion of the final grade is determined by the instructor and field assistants, if any, based on the students attitude, motivation, and ability to work with other group members. The students field notebook will also be graded as a portion of the geologic map component. All data from all the project the student participated in (regardless of the student groups) should appear in a students field notebook. All materials submitted for grading, including field notebooks, will be kept by the instructors for a minimum of one year after final grades are calculated. If the student wishes to display any maps or reports from the course at, for example, an employment interview, arrangements may be made with instructors to check out the materials for a short time. After the one year period, students may pick up any and all project materials. All maps, cross-sections, stereonet, etc., will be inked and colored professionally or else points will be deducted.

Changes in Course Requirements:

Since all classes do not progress at the same rate, the instructor may wish to modify the above requirements or their timing as circumstances dictate. For example, the instructor may wish to change the number and frequency of exams, or the number and sequence of assignments. Students will be given adequate notification of such changes. Although course requirements may be modified, they will still preserve the original course objectives and spirit.

Missed exams \ lateness penalty \ attendance:

The reason for producing a syllabus is to give students advanced notice of exams and

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assignment due dates. Translation: there is no excuse for turning lab assignments in late. As such you will receive an "0" if you do not turn in your lab assignment by the due date. If you have a legitimate excuse for missing an exam (i.e. medical problem), you will be permitted to complete a make-up during the last week of classes provided that you show me a signed certificate from a physician stating that it was impossible for you to make the exam. The make up exam will consist of essay questions.

Honor Policy:

Plagiarism and cheating are not permitted in this class. In fact, either of them will result in severe embarrassment to you and quite possibly an "0" for the assignment or exam in question if you are caught in the act. If you are unsure of what constitutes plagiarism or cheating, speak to me about it. This policy is the same as in the USA student handbook and bulletin, consult them for more information regarding the honor policy at USA.

Disability Policy:

Below is the standard disability policy for the University of South Alabama:

In accordance with the Americans with Disabilities Act, students with bona fide disabilities will be afforded reasonable accommodation. The Office of Special Student Services will certify a disability and advise faculty members of reasonable accommodations. If you have a specific disability that qualifies you for academic accommodations, please notify me, the instructor/professor, and provide certification from Disability Services, Office of Special Student Services. The Office of special Student Services is directed by Ms. Bernita Pulmas and is located in the Student Center, room 270. the phone number is 460-7212.

As the instructor of the course I would also add that several of the mapping assignments in GY480 are physically demanding even for relatively young, college-age students. If the instructor judges that a disability makes a specific project unsafe for a student all reasonable effort will be made to create an alternative project for the student. This may result in the student working alone at base camp for extended periods during the day. If a project cannot be found, the student will use that time to complete office work for the group he/she is assigned to for that mapping project.

VI. Instructor for the Course

Instructor: David Allison
Office: Room 344 Life Sciences Building
Office Hours: will be posted on office door
Office Extension: 7574

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VII. Bibliography

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The University of Chicago Press, 5th edition, 300 p.