

GEO. 420K - INTRODUCTION TO FIELD AND STRATIGRAPHIC METHODS
TUESDAY/THURSDAY SECTIONS, SPRING 2013

LECTURE: Tuesday and Thursday, 2:00 - 3:00 p.m.; JGB 2.216

LAB: Friday 2:00 - 5:00 p.m. in JGB 3.116 (#27495), JGB 3.120 (#27500), JGB 3.222 (#27505), JGB 3.204 (#27502)

INSTRUCTORS: Dr. Greg Frebourg gregory.frebourg@beg.utexas.edu Phone: Office - 471-0338
Dr. Randall Marrett, JGB 4.126 marrett@jsg.utexas.edu Phone: Office - 471-2113

TEACHING ASSISTANTS:

JGB 3.120	Nicole Hart	hartnic4@utexas.edu
JGB 3.116	Dan Arnost	danielarnost@utexas.edu
JGB 3.222	Stephanie Wood	stephanie.wood11@gmail.com
JGB 3.204	Kory Kirchner	korykirchner@utexas.edu

OFFICE HOURS: Frebourg: TuTh 3-4 in Holland Student Center
Marrett: WF 1-2 in JGB 4.126

GRADING:

Field Projects.....	55%	There will be no makeup exams or projects.
Labs	15%	
Lab Exam(s)	15%	
Class Exam(s)	15%	

PREREQUISITES: A grade of C or better in Geo. 416K, 426P, and 416M (Geo. 426P may be taken concurrently with 420K) for B.S. Geology, or C or better in Geo. 416M and Geo. 416K for G.E.H., Geophysics, Hydrogeology, EVS and B.A. Geology. If you do not have these prerequisites and have not already done so, see one of us immediately.

OTHER ITEMS: By registering for Geo. 420K, students agree to be available for field trips on at least **6 (six)** weekends. See the attached schedule for the dates trips are planned. In addition some Friday labs will be conducted off campus, but during normally scheduled lab hours.

Announcements, information pertinent to field trips, labs, etc. will be posted on the 420K Blackboard page. Check it often for information about materials for upcoming labs and field trips.

Academic dishonesty will not be tolerated. Anyone in violation of University policy (see Student Handbook) will receive a failing grade and is subject to additional punitive measures, which may include expulsion from the University.

REQUIRED TEXT: Coe, A. L., Geological Field Techniques. Wiley-Blackwell, 323 pp.

WEB SITE: <http://www.geo.utexas.edu/courses/420k/default.htm>

REQUIRED ITEMS: See Attached list. These items are available in a supply packet at the University Coop.

GEO. 420K – FIELD TRIP DATES
Tuesday/Thursday Sections, SPRING 2013

By registering for GEO 420K, you agree to be available for field trips on at least 6 weekends. The field trip weekends this semester are:

- Trip 1: February 2 OR 3– Dr. Frebourg
- Trip 2: February 16 OR 17 – Dr. Frebourg
- Trip 3: February 23 OR 24 – Dr. Frebourg
- Trip 4: March 30 AND 31– Drs. Marrett & Helper
- Trip 5: April 13 OR 14 – Dr. Marrett
- Trip 6: April 27 OR 28 – Dr. Marrett

These dates are provided to you now so that you can plan your Spring semester weekend activities accordingly. Unlike other courses, the field trips are not supplementary to the classroom work; *they are 55% of your grade*. **Your attendance and participation in all field exercises are required for a passing grade, without exceptions.** Specific information for each trip, *including which days you are expected to attend*, will be posted on the “Trips” pages of the class web site/Blackboard and can be found in the Lab/Lecture Manual.

A list of materials needed for the field exercises is attached.

LECTURE AND LAB SCHEDULE - GEO. 420K, T/TH Sections, 2013

<u>Date</u>	<u>Lecture</u>	<u>Lab</u>
1/15	Overview and Introduction; Geologic Timescales	Compass/Pace and Compass Map*
1/17	The Compass- Measuring Attitudes	
1/22	Sedimentary Rock Description: Essential Elements	Rock and Rock Unit Descriptions
1/24	Measuring and Logging Clastic Rock Successions	
1/29	Biostratigraphy; Sedimentary Structures, Trace Fossils, Fauna	Net Sand Isopach Mapping
1/31	Texas GOM history and Tertiary Regional Context Weekend Trip 1: Tertiary Clastics (2/2 or 2/3)	
2/5	Cretaceous Stratigraphic Evolution of Central Texas	Cyclicity/ Fisher Plots
2/7	Field Trip 1 Post-Mortem	
2/12	Measuring and Logging Carbonate Strata	Unconformities, Correlation & Facies
2/14	Scales of Cyclicity and Correlation of Sedimentary Rocks Weekend Trip 2: Cretaceous Carbonate Section Correlation (2/16 or 2/17)	
2/19	Basin Classification; Sediment Provenance, Paleocurrents; Late Paleozoic Ouachita Orogen and Associated Basin Fill	Topographic Maps
2/21	Field Trip 2 Post-Mortem Weekend Trip 3: Measuring Features in Sedimentary Rocks (2/23 or 2/24)	
2/26	Lithostratigraphy, Chronostratigraphy, and Tools for Correlation	GPS*
2/28	Chronostratigraphy and Age Dating of Sedimentary Rocks	
3/5	Field Trip 3 Post-Mortem; Principles of Global Positioning Systems	No Lab
3/7	Exam	
3/11 - 3/17 SPRING BREAK		
3/19	Mapping Techniques/Location Methods/GPS II	Geologic Maps I
3/21	Geology of the Llano Uplift	
3/26	Interpreting Geologic Map Patterns	Geologic Maps II
3/28	Strike Lines, Dip Calculation and Unit Thicknesses from Maps Weekend Trip 4: Mapping Project 1 (3/30 AND 3/31)	
4/2	Introduction to Faulting	Geologic Maps III/ Folds and Faults
4/4	Introduction to Folding	
4/9	Cross Section Construction	Cross Sections
4/11	Down Plunge Viewing/Geologic Maps as Cross Sections Weekend Trip 5: Mapping Project 2 (4/13 or 4/14)	
4/16	Folding, Continued	Lab Review for Final
4/18	Describing Fabrics in Tectonites	
4/23	Igneous Rock Assemblages	Describing Metamorphic Rocks
4/25	Igneous and Metamorphic Map Patterns Weekend Trip 6: pC Geology, Llano Uplift (4/27 or 4/28)	
4/30	What is G.I.S.?	Lab Final
5/2	Evaluation and Review	
5/13 or 5/14; 2-5 PM or 9-12 noon		Final Exam

* Lab conducted outdoors, prepare accordingly.

GEO 420K - EQUIPMENT LIST

- Most items are available in a single course packet for sale at the UT Co-Op

REQUIRED MATERIALS

Field notebook with waterproof paper (e.g. surveyor's field book)
Geologic hammer
Silva Ranger Compass
Hand lens - 10X Mag. or better
Small squirt bottle for acid (acid will be provided)
Six-inch ruler with mm and inch scale (best if with a protractor)
Protractor, smaller is better
Mechanical Pencil: Pentel 0.5 mm or equivalent with F or 2H hardness lead
Colored pencil set - 6 colors minimum; hard lead, shouldn't smudge
2 technical (drafting) pens (#0 and #00)
Proper field clothes, particularly hat and shoes/boots
Clipboard with cover (standard 8 1/2 x 11" size, without a large metal clip)
Erasers/liquid paper
Canteen (1 or 2 one-quart canteens)
Watch
Knapsack or carrying bag
Grain size scale card – available in the JSG undergraduate office

DESIRABLE MATERIALS:

Rainwear
Aspirin, chap stick, bandaids, sunscreen or tanning lotion, insect repellent, etc.
Toilet paper

PROHIBITED ITEMS:

Firearms
Alcoholic beverages in University vehicles
Controlled substances and narcotics

Course Objectives

Why a class in geological field methods? Geology is first and foremost a field science. Field geology and field geologists provide literally the ground truth for geologic concepts and theories of how the earth works. *The degree to which we, as geologists, are successful observers and interpreters of rocks in the field depends in large measure on what we are prepared to see and record.* The old adage “I wouldn’t have believed it if I hadn’t seen it” is, in the case of field geology, more truthfully “I wouldn’t have seen it if I hadn’t believed it”. We explore. We discover. Unfortunately, without sufficient experience and preparation we also frequently ignore what we don’t recognized or understand. Developing what anthropologists have called “professional vision” – the ability to quickly recognize and sort the significant from insignificant – is one of the most important skills a field geologist possesses. You will begin honing that skill in this class.

Successful field work also depends greatly on how well we can formulate and test ideas while in the field. Without proper preparation, including a strong grounding in field methods, we are little better than rock hounds out for a day of casual collecting. Field geology is not merely collecting data and samples; it is about making sense of the geology around you, about making geologic interpretations. Landscapes are histories, with time marked by boundaries in the rocks, soil and sediment. A geologic map or a measured section is the articulation of that history, with each line marking a before and after, a hiatus that might last a second or a billion years. Through our maps and graphical logs, we represent time as space. *The ability to create, read and interpret such product is best developed from training and practice in a field setting.* It all begins by making and recording observations. An accurate record in the form of a map, measured section, photograph, sketch, a carefully documented sample, field notes, etc. provides a permanent, solid basis upon which to develop testable ideas and interpretations – the plot of the story. Without such evidence, interpretations are fanciful fables; there is no scientific basis to objectively evaluate them.

Field proficiency has long been a distinguishing characteristic of our science. As a geoscientist, you are expected to be a proficient scientific observer and recorder. Your unique skills and training in this area separate you from lawyers, engineers, chemists and other professionals with whom you might one day work. Geology is rooted in the scientific method, so the process of formulating hypotheses and testing those hypotheses through careful data collection are fundamental skills to a geologist.

As suggested by the course name, this class contains two main components. This semester our principal objectives are to: 1) learn and apply geologic field methods to *describe, measure, map, sample and report on* rocks in the field and in the laboratory; 2) acquire an understanding of the elements of stratigraphy (e.g. what is a Formation? what are lithostratigraphic, biostratigraphic and chronostratigraphic units? what is a type section? how are rock units correlated?) and the field methods upon which they are based. Like all sciences, geology has its own vocabulary. There is no better way to learn a language than to be immersed in it, and field experiences, however brief, provide that immersion.

Some of you may find this an uncomfortable experience. Unlike most subjects, field work can not be mastered by studying hard, nor is there a set formula for successfully interpreting the rocks you will study. You will learn largely by doing and making mistakes. Get comfortable with this idea now and you’ll be less anxious in the long run.

Finally, it is often said “The best geologist is the one who has seen the most rocks” and there is much truth to it. Six weekend field trips and a semester of labs will provide an introduction, the beginnings of a mental catalog of rocks and field relationships that can provide a framework to build upon in future classes, later field work and a future career in the geosciences.

GEOLOGY 420K—FIELD METHODS: 2013 LAB SYLLABUS

<u>TA</u>	<u>OFFICE #</u>	<u>OFFICE HOURS</u>	<u>EMAIL</u>	<u>CLASSROOM</u>	<u>SECTION</u>
DANIEL ARNOST	HOLLAND CTR (JGB 3.330)	12-2 Mon	danielarnost@utexas.edu	JGB 3.116	27495
KATE ATAKTURK	HOLLAND CTR	10-12 Wed	atakturk@utexas.edu	EPS 1.102	27480
ADAM GOLDSMITH	HOLLAND CTR	12-2 Mon	atom.goldsmith@utexas.edu	EPS 2.102	27506
NICOLE HART	HOLLAND CTR (JGB 3.328)	9-11 Tues	hartnic4@utexas.edu	JGB 3.120	27500
KORY KIRCHNER	JGB 3.330	1-2 Mon, 3-4 Tues	korykirchner@utexas.edu	JGB 3.204	27502
ALEX PARKER	JGB 6.142	12-1, Mon&Wed	johnalexparker@gmail.com	EPS 2.136	27485
TIM SHIN	HOLLAND CTR (JGB 3.328)	12-2 Mon	timshin@utexas.edu	JGB 4.102	27490
STEPHANIE WOOD	JGB 6.142	3-5 Tues	stephanie.wood11@gmail.com	JGB 3.222	27505

Important Information

Assignments

- Late assignments will **not** be accepted and it is **not** possible to make-up labs or field trips, you must be present for the scheduled dates and times.
- Academic dishonesty will not be tolerated.
- **Lab assignments** are **due** the **MONDAY or TUESDAY** (depending on your section meeting day) **after** labs, **in lecture at 2 PM.**
- **Field trip assignments** are **due** the **WEDNESDAY or THURSDAY** (depending on your section meeting day) **after** labs, **in lecture at 2 PM.**
- One of the TA's will be present at the beginning of lecture to collect the assignments. If you do not turn your assignments in to the TA at the **beginning** of the class period it will be considered late and you will not receive credit.

Grades

- | | |
|------------------|--|
| • Field projects | 55% (6 weekend trips; remember, no late/make-ups) |
| • Labs | 15% (remember, no late/make-ups) |
| • Lab exam(s) | 15% |
| • Class exam(s) | 15% |
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- Make sure you attend your own lab (by unique number)
 - Please bring **all** your field gear for **every** field trip, and **all** your lab equipment for **every** lab:

<u>For every field trip</u>	<u>For every lab</u>
field notebook	field notebook
rock hammer	hand lens
hand lens	acid bottle
acid bottle	6" ruler or scale
protractor	protractor
6" ruler or scale (C-THRU w/ protractor is best)	pencils with 2H lead
pencils with 2H lead	colored pencils
colored pencils	erasers
erasers	
Brunton compass	
map board or clip board w/cover	
drafting pens	
white-out	
water bottles	

TA office hours are for your benefit, please feel welcome to attend with questions!

Think critically! Ask questions! Challenge your mind!