Full Period

Add your email address on sheet coming around-

First Day Lab

Description of class
Course reader and lecture notes
Text Book
Equipment and supply list
Assign Field equipment
Set magnetic declination
Prepare topographic base maps
Practice trend and plunge,
Strike and dip
Drivers
Prepare for first mapping day
We go out rain or shine

Please ask questions as we go
Lawson’s first field class 1892

Lawson and Palache’s map of the Berkeley Hills
Zone of mapping: 3 by 7 km

Undergraduate and Graduate Components:

EPS 101 and 271 have the same basic lectures and field experiences. Graduate students enrolled have 2 additional lectures on advanced topics in digital mapping using precision GPS, lasers and infrared spectroscopy. The field report for graduate students will also contain an additional section on proposed applications of digital mapping to their research area or future teaching experience.

Undergraduates in EPS 101 are welcome to attend these lectures if interested.

Prerequisites: EPS 50 or equivalent introduction to general geology Required

Textbook: Field Geology and Digital Mapping by George Brimhall (draft in Reader)

Class hours: Mondays and Wednesdays: Lectures 1:00-2:00 and Field 2:00-5:30 p.m.

Note 5:30 +/- 20 minutes

Drivers: George Brimhall & Russell McArthur
4 more are needed- please see George during class today

Course website: http://eps.berkeley.edu/~brimhall/EPS101_271/Website_EPS_101_271.htm
http://eps.berkeley.edu/~brimhall/EPS101_271/Website_EPS_101_271.htm

Username: eps101  Password: moraga4
Learning styles: all integrated

Visual patterns

Auditory

Text

Kinesthetic (by doing)

Project focus

Exploratory learning

Creation of a complete, original work with report, map and cross section

Interpretation of the history of geological processes
The path to professional grade mapping EPS 101 and EPS 118: Fundamental skills of our craft of field geology
Create a supportive environment
It comes with expectations and an abiding sense that hard work matters

Deliberate, disciplined
Practice
Execution

What you do- always matters
Deep understanding of concepts and technology
Advantage of GeoMapper

EPS 118 Emersion

Caution:
You will need to pay attention to all details
“There but not there” effect
You have to take charge of your own learning
I am not here to entertain but to teach
What you are expected to learn is important

Safety and Security at all times is our first concern
Safety and security is about a human chain. The chain usually breaks at the weakest link
This makes being safe and keeping our equipment secure very hard.
Nobody can relax their attention to safety for a second nor can anyone assume that if you do not take care of keys, things will work out.
What is a geological map? How different from Google Earth?

A geological map is very different from a photograph.

Maps invariably show many important features of the earth which are completely invisible on photos or satellite images.

These special features found only by mapping include **rock type identification, rock origin, age relationships and interpretation of the nature and sequence of many types of geological processes**.

Photographs, especially large scale aerial photographs and satellite images do offer their own unique advantages. You will also learn to use air photographs. One of the reasons why maps show so much more than photographs is that maps are made by **piecing together close up observations** of the earth rather than rely on perspectives taken at a distant point in space.

Mapping is a perfect example of how it is the journey not the destination that matter
Not hiking but mapping

Mapping is a form of graphical symbolic representation-
It has two interrelated parts- one **abstract** (formations, etc) and the other **observable outcrops** which are more tangible- hands on – mapping software must handle both forms

Spatial intimacy provides details and ground truth.

Proximity also has its limitations. From one point on the earth, larger patterns cannot be perceived and must be pieced together by progressive observations which provide enough perspective to reveal a large-scale pattern. Making geological maps is hard, time-consuming work but it has many rewards including the fact that it can be very exciting.
Goal: To begin your study of the geology of California and study of the earth as a natural laboratory by developing your powers of field observation through first-hand experience, intensive training and then systematically mapping key regions.

While mapping technique is taught, this course stresses mapping as the most basic and realistic means of comprehending the earth’s architecture necessary for interpreting geological history of internal and external processes.

Ultimately a synthesis of discrete bits of information provide a comprehensive basis for interpreting the geological history of California. There are two key processes in field geology: (1) mapping and (2) interpreting already-made maps.

Strategy: Since no one has the time to cover every inch of a field area, mapping is a matter of making intelligent choices about how to spend your time in the field: where to go, what to observe, how long to take, where to go next, and most of all, knowing why you are in a certain place.

Field geology requires exercising scientific discipline similar to laboratory investigations and requires the same attention to proper application of the scientific method. Mapping is not just covering a piece of paper with color nor is it a fishing expedition hoping to "catch" something.

Time management makes a huge difference to your success when we reach the part of the class where you work independently. Therefore you will learn a sequence of field activities which ensure that relevant data of sufficient accuracy are collected and recorded on your map in a timely fashion.
Typically, **as you map, a pattern emerges** which helps guide your subsequent work and **shows the most efficient steps to take next**. **This guidance you map provides is critical to effective mapping.**
The sequence involves planning, accuracy, decision making.
The **steps** are:

1. locate yourself on topographic base map
2. inspect the **whole** outcrop,
3. determine lithology (rock type),
4. measure stratigraphic and structural attitudes,
5. plot information,
6. draw in contacts with uncertainties indicated,
7. record salient observations in your field book **if necessary,**
8. decide what to do next and later
9. ink map information in order that it become a permanent record and not be lost if map becomes wet or abraded.

**We will progress through a training sequence designed to build skills, efficiency and confidence which equips you ultimately to work independently.** Towards that end we will first work as a **group** with daily instruction and close supervision and then encourage more **independent work in small groups.** Near the end of the course you again can select working groups.

**Verbalization** and articulation of geological reasoning is essential to your learning so engage in discussion.

Collaborate do not copy- it is not a big problem set
Function of the course: this class is essential to all other required and elective geology courses as it is in the field that you will first personally confront geological reality and start to comprehend the complexity and enormity of geological processes in nature.

You will (1) learn how to map and (2) how to use published maps. You will acquire a deeper appreciation of the geological time scale and a better sense of the physical scale, nature and variety of geological processes. You will also become more aware of the succession and superimposition of events evident in observable features of rocks and their structures and will learn ways to unravel their history into understandable chapters of earth history.

Observing geology is very different from listening in a lecture of laboratory classroom environment or just reading a published map.

Paying attention is essential—otherwise you will miss key instructions.

Rocks often provide only an imperfect, scant record of earth history. A single rock may be complex and may contain evidence of multiple processes which must be unraveled. To assist the intellectual growth required to be able to unravel the rock and structural record, we will learn in stages. We will break up the complexities into manageable pieces; gain skills, learn through lectures and reading, and ultimately, students completing this sequence will gradually find that they are in fact working independently on important field problems. There is a distinct learning curve:
Digital geological maps
Role of geological mapping: Rigorous geological mapping of real exposures and intrinsic limitations is the basic tool of field work. The constraints and controls that places on understanding processes is vital to all other types of earth science study: pet geochemistry, geophysics, geomorphology, mineral resources, tectonics and planetology.

Scientific tools: The physical tools are very simple. We use a topographic base map (scale 1” = 600 feet with a 20 foot contour interval) on which to locate ourselves and to record data on one, two and three-dimensional geological features surveyed and measured using a Compass, a protractor to measure angles and distances to the scale of the map and colored pencils to represent different mappable units: rock formations, faults, and contacts. You will also need a rock hammer and hand lens, also a fine point pen for inking in your mapping so as to not lose lines and detail. Additional notes will be taken in waterproof field book. Later in the course you will have an introduction to mapping on stereographic (3-dimensional) colored air photographs. Inexpensive rain gear will make it possible for you to map effectively even in the rain when it is necessary so that we do not lose valuable time.

Starting with Lecture 10 we transition into digital mapping using Pen tablet PC portable computers with integrated DGPS.

Digital base maps: topography, color orthoimages, epicenters
Expectations and hazards: As this is an interactive progressive class, participation in group discussion is expected as the instructors stimulate dialogue to help illustrate geological features and to obtain feedback to gauge comprehension.

It is essential also to keep up with the daily field work and reading for timely progress. Reading cannot be put off.

Quizzes: will be given every week in order to see where students are in their understanding. Occasionally, a student will not meet the minimum standards required and will be asked to drop the class so that the progress of the class as a whole is not impeded.

Missing more than 2 days of class makes it impossible to keep up unless a special circumstance is brought to the attention of the Instructor eg illness with a Doctor’s slip

The instructor expects that all students will work safely being particularly careful with (1) use of rock hammers and (2) in hiking on steep slopes where you could fall or cause others to fall. Common courtesy and respect, constant awareness and concern for others is essential to the safety of the group and is essential to the learning process itself as we work in unusually close proximity to one another under adverse outdoor circumstances very different than classrooms. Safety while driving and while in the field is essential.

Safety training is a theme in this course.
For example, we often walk on narrow trails. Be careful!

Each lecture will start with a short Safety debriefing
Drivers report issues with vehicles to instructor by end of each field session

Disrespect of any kind is not tolerated including other people’s time which is taken to be very valuable. When we are walking between outcrops, conversation about geology is encouraged. However, constant dialogue about topics other than geology can be so disruptive that the educational experience is compromised of other students who are striving to learn by hearing what is being said concerning geology
The **vehicles** must be respected too and the back seat entered only after folding down both of the side seats, not jumping over them. The vehicles must also be kept **clean**. Always wear a pair of street shoes to class and change into field boots in the field. Bring your boots in a plastic bag.

**No muddy boots are allowed in McCon Hall and especially not in 325 or 345**

Please make certain to dry out your Brunton compass each night after using it during a rainy day.

The body of some compasses is plastic so do put it too near extreme heat.

Take your boots home and wash out the cleats and dry them.

Lockers are not for storing dirty clothes- only field equipment.

Bring your key every day and all your field gear

Lost key replacement is $ 5.00

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**Brimhall Digital Mapping Lab in 345 McCon**

Individual lockers assigned to each of you and others

Some lockers now have **pen tablets & mapping vests**.

Please leave them undisturbed until we get to Lecture 10. Make certain that the locker is securely locked.

Following instructions makes this technology possible- follow the instructions.

**Locker Key**

**Field book**

**2 mapping scales**

**Mapboard**

**Brunton Compass**

**Orange safety vest**
Poison oak abounds in the Berkeley Hills and is the major threat to your well-being. We will try to avoid it whenever possible, but *long pants, a long sleeved shirt and a cap are a must* in order to minimize unavoidable exposure to it. Every effort should be made not to rub your eyes with hands bearing oil from the leaves or stems. After each field day, a shower using repeated scrubbing with strong soap and a thorough washing of clothes are necessary. Poison oak cremes (Technu) are also available which you may wish to try. See http://www.life-assist.com/a100.html

Lyme disease has been found to accompany some ticks bites. If a red ring appears around a tick bite, go to the Tang center and tell them you were bitten by a tick and need antibiotics.

Watch out for mountain lions.

Be sure to lock all valuables in the security boxes in one of the vehicles while we are out. University insurance does not cover any personal items.

Whatever you do, never assume that you are Immune to poison oak and always handle your Clothes so that nobody else come sin contact
Lyme Disease Rash

Occurs 3-30 Days (avg. 7-9 days) After Bite

Erythema Migrans (EM)

What Is Lyme Disease?

Lyme disease (Borreliosis) is a preventable bacterial disease transmitted to humans and animals by the bite of a Western Black-Legged tick. It may be cured by early diagnosis and appropriate antibiotic treatment, but it may persist in the human body for years if not properly treated. The natural history of this disease is not completely understood, and the illness it produces in humans can be difficult to diagnose because of the varied symptoms.

Lyme disease was named for Old Lyme, Connecticut, where the first cases of Lyme disease were reported. The first case in California was reported in 1981. It is the most commonly reported tick-borne disease in California, as well as in the United States.

If I Am Bitten By A Tick, Will I Get Lyme Disease?

Only about 1-2% of the adult Western Black-Legged ticks in California are infected with the bacterium that causes Lyme disease. In some areas north of the San Francisco Bay Area, up to 6% of the adults may be infected; this is much higher than in the northeastern U.S., where 30-40% or more of the adult ticks are infected. Evidence indicates that the bacterium is vectorially transmitted to humans until the tick has fed for at least several hours.

What Should I Do If I Am Bitten By A Tick?

SINCE IT MAY TAKE A DAY OR MORE FOR THE TICK TO TRANSMIT THE BACTERIA, PROMPT REMOVAL OF TICKS SHOULD PREVENT DISEASE TRANSMISSION.

1. Gently pull the tick off the skin. NEVER USE YOUR BARE HANDS! Do not squeeze or crush it, as this could cause the release of bacteria and increase the risk of infection.

2. Gently pull the tick from the skin. DO NOT TWIST OR RUB THE TICK. DO NOT ATTEMPT TO REMOVE BY BURNING WITH CIGARETTE OR BY APPLYING Vaseline, Kentucky, ETC.

3. Apply an antibiotic to the bite area after removing the tick. Wash your hands with soap and water.

4. SAVE THE TICK FOR IDENTIFICATION. Contact your local Vector Control, Mosquito Abatement District, or health department to determine if the tick is one capable of transmitting Lyme disease.

5. If the tick cannot be removed or part of it is left in the skin, consult your physician.
What Should I Do If I Think I Have Lyme Disease?

Early recognition is very important. If you have found a tick attached to your skin, or you work in an area where ticks are known to occur, and you have any of the symptoms listed in this brochure, tell your physician immediately of your suspicions and ask for the tick. This information should help your physician make a diagnosis. This may be especially important for pregnant women. If you have developed a rash as described below, take a picture of it for possible future reference.

What Are The Symptoms And Signs Of Lyme Disease?

An early sign of Lyme disease may include a spreading rash which may be accompanied by fever, chills and/or fatigue. Possible late complications of the heart and/or nervous system may occur as well as severe arthritis. Two stages of the disease are currently considered, but either of these stages may not occur or they may overlap.

Acute Stage

The first recognizable sign usually is a slowly enlarging red rash, known as erythema migrans (EM), about the size of a half-dollar or larger. This is located in 60-80% of persons who contact Lyme disease. One or more rashes may appear on the body. The rash occurs 3-30 days (average 7-10 days) after the bite of an infected tick. The rash expands over a period of days or weeks to form a large circular lesion, often with a central clearing.

Flu-like symptoms may also occur in this stage. These symptoms may persist, change, disappear and reappear intermittently for several weeks.

(Later a full bite will be followed by a maculation within hours creating a redness at the site of the bite which does not expand and disappears within a couple of days, but this must not be confused with Lyme disease.)

Late stage

Initially during this stage, patients may experience migratory pain in joints, tendons, muscles and bones often without joint swelling or redness. However, months after onset, arthritis with marked joint swelling is common. Some infected persons may develop long-term complications weeks to months after the initial symptoms. These complications may include disorders of the heart or nervous system. Abnormalities of the heart include various degrees of heart block (disturbance of the electrical conduction system). Facial paralysis (Bell’s palsy) and other nervous system abnormalities may occur.

Months to years after disease onset, patients may develop joint pain and swelling that appears and disappears intermittently for several years. Large joints, especially the knees, are most affected. Lyme arthritis may become chronic, with erosion of cartilage and bone. Chronic neurologic symptoms and chronic skin conditions may also occur.

NOT The Lyme Disease Rash

Possible Reaction to Tick Bite

- Does not spread
- Disappears in 2-3 days
- Occurs within hours

Known Carrier Of Lyme Disease

Western Black-Legged Tick
Ixodes pacificus
Is Lyme Disease Treatable?

Yes. Most cases of Lyme disease can be successfully treated with antibiotics, but early treatment is important.

Are Blood Tests Accurate In Detecting Lyme Disease?

Blood tests have been used in addition to evaluating clinical symptoms for diagnosis, but the test alone is not sufficient for diagnosis. At this time, the Centers for Disease Control are working to standardize the blood tests to ensure accurate test procedures and interpretation of the results.

The blood test should not be obtained until several weeks after the tick bite because the blood test is not very sensitive in the early phase of the disease. The test measures antibody levels against the bacteria in the blood. Antibody levels can be affected by medications and infection by other disease organisms, which may cause the test results to be inaccurate.

How Can I Protect Myself From Tick Bites?

1. Wear long pants and long-sleeved clothing and shoes covering the tops when in "tick country". DON'T wear shorts, sandals, or sleeveless shirts!
2. Wear light colored clothing so ticks can be easily seen and removed before they become attached to the skin.
3. Tuck pants into socks or boots, and shirt into pants.
4. Use insect repellents on shoes, socks, pants, and shirt. Read the directions for application. (DO NOT APPLY REPELLENTS TO THE FACE.) Consult a pharmacist or interview for safety in the event of being bitten by ticks. Most repellents contain the same active ingredient DEET (N,N-Diethyl-3-methylbenzamide).
5. Choose white/tinted and walk in the center of trails. Avoid heavily wooded areas and areas with tall brush.
6. THOROUGHLY CHECK YOURSELF AND YOUR CHILDREN FREQUENTLY FOR TICKS. YOU AND YOUR FAMILY CAN CONTINUE TO ENJOY OUR GREAT PARKS AND OPEN SPACE AREAS BY FOLLOWING THE ABOVE GUIDELINES FOR PERSONAL PROTECTION.

What Does The Tick Look Like?

In California, the Western Black-Legged tick (Ixodes pacificus) is the major carrier of Lyme disease. The adult female is reddish brown with black legs, about 1/8 of an inch long; males are smaller and entirely brownish-black. Ticks that have taken a blood meal (called engorged) will appear much larger, gray in color, and can reach the size of a pea. Ticks in their immature life stages can be as small as the head of a pin or poppy seed.

Where Is The Western Black-Legged Tick Found?

This tick can be found on grasses and brush in rural settings that receive afternoon shade. These ticks do not like sunny, open areas. Ticks feed on deer, rabbits, Iberians, mice, and other animals. Ticks do not fly, jump, or drop from trees. Ticks climb to the tips of vegetation, typically along animal trails or paths, and wait for an animal or human host to brush against them so they can attach themselves.

Is Lyme Disease Only A Summertime Threat?

No! Lyme disease can be contracted during any season of the year. Ticks feed at various times of the year, including winter. The adult ticks are usually seen November through April. The nymphal tick (immature stage) is usually present early spring to late summer, peaking in mid to late May. Due to the smaller size of the nymphal tick and more outdoor activity by people, chances of an infectious tick bite are increased.

Can Pets Get Lyme Disease?

Yes. Lyme disease has been reported in dogs (rarely in cats), horses, as well as a number of wild animals. Symptoms may include fever, loss of appetite, arthritis, intermittent paralysis, and lack of energy (no rash). The products used for fleas will also control ticks. Check for ticks and brushed hairly exposure to ticks. Have your pet examined by a veterinarian if you suspect it has Lyme disease.
CALIF. DEPT. OF FISH AND GAME OFFICES:
1416 Ninth Street
Sacramento 95814
(916) 445-7203

40th Street
Kingsville
(916) 547-3573

761 North Lake Blvd
Roseville 95678
(916) 353-8978

1234 E. Shaw Ave.
Fresno 93710
(209) 222-7361

30 Goldstein
Ste 50
Long Beach 90802
(310) 880-8332

619 Second Street
Santa Ana 92701
(714) 445-6499
or (714) 445-6491

Please help the California Department of Fish and Game educate the public on how to safely coexist with lions. Share this brochure with a friend. For more copies, and for information or additional reading material about mountain lions, contact any Department office.

LIVING WITH

CALIFORNIA MOUNTAIN LIONS.

About half of California is prime mountain lion country. This fact is a surprise to many residents and visitors. These large, powerful predators have always been feared, respected, and even revered by the indigenous peoples of California. They are an important part of the ecosystem.

The name of the mountain lion in California is derived from that of "mountain lioness," a term used in the 18th, 19th and 20th centuries to refer to mountain lions. The name "mountain lion" was adopted in the 20th century. In 1929, the mountain lion was named the "official mascot" of California. The mountain lion is a protected species in California. In 1990, the mountain lion population in California was estimated to be 3000. The decline in the mountain lion population was attributed to habitat loss, human-wildlife conflict, and habitat fragmentation.

You can live in mountain lion country. Like any wildlife, mountain lions can be dangerous. With a better understanding of mountain lions and their habits, we can coexist with these magnificent animals.

WHAT SHOULD YOU DO IF YOU ENCOUNTER A MOUNTAIN LION?

There has been a lot of research on how to avoid mountain lion attacks. However, mountain lion attacks that have occurred are being studied in order to determine how these events can be prevented. One of the most important steps in preventing an attack is to avoid something that might inadvertently provoke or attract a mountain lion.

When a person is approached by a mountain lion, there is no way to escape without attracting the attention of the animal. This may result in a dangerous situation. The following suggestions are based on studies of mountain lion behavior and analysis of attacks by mountain lions, injury and property damage.

1. **DO NOT HIDE:** Get up immediately and try to break away from the mountain lion.

2. **KEEP CHILDREN CLOSER TO YOU:** Observations of exposed wild mountain lions reveal that the animals are usually drawn to children. Keep children within your sight at all times.

3. **DO NOT APPROACH A LION:** Most mountain lions will try to avoid a confrontation. Give them a way to escape.

4. **DO NOT DROPPED FROM A LION:** Running up will only stimulate a mountain lion's instinct to chase. Instead, stand and wave your arms. Make eye contact. If you have small children with you, pick them up if possible so they don't panic and run. Although it may be frightening, pick them up without having them touch the mountain lions.

5. **DO NOT CRUSH OR BEAT THE LION OVER:** In terms of mountain lion behavior and temperament, the best thing you can do is to avoid them. Do not attempt to kill or harm the mountain lion. This will only provoke further aggression.

6. **DO ALL YOU CAN TO APPEAR LARGER:** Raise your arms. Open your jacket if you are wearing one. Again, pick up small children. These instincts, habits, or anything you can reach without causing fear or turning your back. Wave your arms loudly and speak firmly in a loud voice. The idea is to convince the mountain lion that you are not prey and that you may be a danger to it.

FIGHT BACK IF ATTACKED: A hiker in Southern California said a bear fell from a mountain lion that was attacking her son. Others have fought back successfully with sticks, caps, jackets, garden tools and their bare hands. Select a mountain lion usually uses to use me or your or necks, try to remain standing and face the attacking animal.

IMMEDIATELY REPORT ALL ENCOUNTERS OR ATTACKS.

If you are involved in a face-to-face encounter with, or an attack by, a mountain lion, contact the nearest office of the California Department of Fish and Game. If you are involved in a face-to-face encounter with, or an attack by, a mountain lion, contact the nearest office of the California Department of Fish and Game. See the nearest Sheriff's Office to be put in touch with the Department of Fish and Game. The threat to public safety will be assessed and any appropriate action will be taken. Also report any sightings of dead or injured mountain lions.
Barbed wire and Cyclone fences:

Have your tetanus shots up to date.

Driving:

The greatest risk to your health and safety

Drivers: use low gears going down hill to use engine compression instead of wearing out the brakes.

Emphasis of the report: The main goal of the report on the Berkeley Hills is to use your own mapping and field observations to construct and present in a report the geological history of the Berkeley Hills in the context of California geology. The focus is on the nature of sequential geological processes, their change over time and an evaluation of the most likely explanation. This is not intended as a term paper written as a library exercise but instead it involves synthesis of an extensive data set constructed piece by piece from scientific observations of your own and critical use of the readings. Much weight is placed on separating factual data, that is observation from inference. Interpretations may vary and evolve in time with reconsideration of the available facts or further, especially more detailed mapping, but the data withstand the test of time. Although reading is required, the emphasis in this is on your own observations and deductions.

Honor Code: No student shall use in any way whatsoever reports written by students in previous years. All such reports are off limits to Geology 101 students. This is a discovery-oriented course and use of work by previous students does not serve the intrinsic purpose of the course. All reports will be submitted as a computeproject which is archived and cross routinely checked making it even more ill-advised work (text, maps, sections) by previous students.

Grading: Quizzes 30 %, Term Report 70 %

It is necessary to read and study all material in the reader on a regular basis so that you can listen and interact with the instructors, bring the reader to class day as most illustrations in the lectures are contained in it.
<table>
<thead>
<tr>
<th>Week</th>
<th>Date</th>
<th>Reading</th>
<th>Paper #</th>
<th>Page(s)</th>
<th>Notes</th>
</tr>
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<tbody>
<tr>
<td>1</td>
<td>Mar 2</td>
<td>1-3</td>
<td>No lecture</td>
<td>Field Lab</td>
<td>Geophysical mapping &amp; interpretation of elation changes; field trip to Grizzly Peak.</td>
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<tr>
<td>2</td>
<td>Mar 8</td>
<td>3-5</td>
<td>No lecture</td>
<td>Geophysical mapping</td>
<td>Geophysical mapping of Grizzly Peak.</td>
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<tr>
<td>3</td>
<td>Mar 15</td>
<td>6-8</td>
<td>No lecture</td>
<td>Geophysical mapping</td>
<td>Geophysical mapping of Grizzly Peak.</td>
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<td>Mar 22</td>
<td>9-10</td>
<td>No lecture</td>
<td>Geophysical mapping</td>
<td>Geophysical mapping of Grizzly Peak.</td>
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<td>5</td>
<td>Mar 29</td>
<td>11-12</td>
<td>No lecture</td>
<td>Geophysical mapping</td>
<td>Geophysical mapping of Grizzly Peak.</td>
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**Field Geology Class by Prof. George Brimhall**

UC Berkeley Dept of Earth and Planetary Science

Parking:
Main mapping route:
Field Geology Class by Prof. George Brimhall
UC Berkeley Dept of Earth and Planetary Science

Grizzly Peak Stables

Siesta Valley

Claremont Ave

Highway 24

Gateway Exit
Earth and Planetary Science 101/271 Equipment and Supplies List

We will be working in the lab the very first day of class. Please bring a sharp pencil and eraser. We will be working in the field on our second scheduled class period so these supplies must be purchased by each student by the second day, pencils sharpened, ready to go, and brought to class on that day for use in the lecture and field. Also please remember to wear your field clothes like jeans, coat and a cap. Since figures used in the lectures are contained in the reader, bring it to class every day. Also, have your field book sheets cut out and pasted into your field notebook.

Course reader and lecture notes available: Vick’s Copy 1879 Euclid Ave., Tel. 549-2679. Cost: (about $ 53 including tax) This includes Sections of a new book on Digital Mapping in preparation by Brimhall.

Supplies to purchase:

Dick Blick formerly the Art Store 811 University Ave. 486-2600

Note: if Dick Blick runs out, you might also find the items at:

The Ink Stone (2302 Bowditch) 543-1162, theinkstone@earthlink.net

or Amsterdam Art (1012 University Ave.) 649-4600. One block west of San Pablo.

Buy only PrismaColor Verithin brand as they are hard, fairly waterproof pencils. These will be used in our class for geological mapping on paper before we use digital mapping computer systems.

PrismaColor Verithin brand 12 color set containing these colors or bought separately:

- Poppy Red # 744
- Orange # 737
- Indigo # 741
- Dark Brown # 746
- Violet # 742

2 black graphite drafting pencils: one each Mars Staedtler 2H and 3H Lumograph.

10 erasers for end of pencils glued onto the end of each pencil,

3 pens: Micron 05 pens in black, blue and red. These are for inking maps.

1 thin white vinyl eraser with pocket clip

Koh-I-Noor 3-hole aluminum pencil sharpener.

1 can of spray adhesive Super 77 to affix printed field book sheets supplied by reader as headings. 1 can shared by several students. Be sure to clean out the tip after each use by spraying upside down.

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Miners Catalog Toll-free number: (800) 824-7452 or Online http://www.minerox.com/results.cfm

Rock Hammer (geologist’s pointed-tip pick with a 22 oz. head and a sharp point on a chisel point). Price about $39.70.

Hand lens: 14-Power Hastings Triplet $ 38.45 or 20 power Iwamoto $ 87.60 which is expensive but makes a great graduation present. You can use now. Put hand lens on a neck thong or string around your neck.

Field boots: Try Wilderness Exchange on San Pablo or REI at 1338 San Pablo (both near Cedar). Used boots are often more comfortable and save a lot of money. Do not buy heavy expedition boots, but instead more flexible intermediate weight hiking boots with Vibram soles. Spending more than $20 is unnecessary. Be sure to waterproof the leather parts of your boots using either with beeswax or Snow Seal.

Simple inexpensive belt with a non-magnetic buckle to hold your Brunton compass and loop for rock pick.
Each student should order on their own:

**Correlation of Stratigraphic Units** (COSUNA Charts) The American Association of Petroleum Geologists (AAGG) as a CD ROM ($49.00) use the web:

http://www.aapg.org/index.html

Online Bookstore
Browse by Series
AAPG/Datapages Product Databases/Data Sets
Correlation of Stratigraphic Units of North America (COSUNA) Charts
Content: These COSUNA charts have stratigraphic sections for the entire USA. You will use them not only in this class, but probably for the rest of your career as no matter where you are, you can find the rock types in your area, ages, and thickness variations.

**RECOMMENDED:**

American Geological Institute (AGI) Data Sheets for Geology, in the Field, Laboratory and Office ($43.75)

Content: These pages contain a wide variety of data in geology and geology including standard classification schemes for rocks, crustal abundance data, and index fossils.

Provided by the Department and checked out on first day of class:

Brunton Compass (pocket transit), map case and copies of Berkeley Hills topographic map
Preparation of Geology Field Note Book

Please find Xeroxed copies of Field Note Book pages following this sheet. Cut them out along the indicated lines and using spray adhesive, affix them to field notebook sheets so that pairs of pages, e.g., the Schedule, are open at the same place. Spray these pages with Krylon to help waterproof them.
We will also check this setting in the field
Azimuth is represented by numbers measured clockwise from North which has an azimuth of zero. For example, an azimuth of 90 degrees is east, 180 is south, 270 is west.
Magnetic declination changes over time

See global map of declination
Also use the reference material in the back of your field books

Use COSUNA link on laptop
Berkeley Hills K/Ar Ages & Fossils

8.2 m.y. Bald Peak Basalts
   No fossils

8.5-9.0 Siesta Valley Tuffs
   Beaver: Eucastor lecontei
   Horse: Hipparion mohavense

9.0 Upper Grizzly Peak (Moraga) Basalts
9.5 Rhyolite Tuff
10.2 Lower Grizzly Peak
   Fresh water fossils in limestones

10.5-13 Orinda
   Mammals: Gomphotheres
   Horse: Nanipus echocircus
   Marine invertebrates (Minor)
   Non-Marine inverte. (Major)

13-16 Claremont Shale and Chert
   Foraminifera

Sobrante Sandstone

Geological Field Report (Length 8 to 12 pages)

Abstract (maximum 200 words)

Introduction
   Dates of the study
   Scope of the report

Focus on problem recognition and solving

Stress your own work and interpretations

Limitations

Location and accessibility

Stratigraphy and relations between map units,
   thickness, variation, unconformities, baked
   zones, paleosols and weathered zones.

Interpretation of contacts: continuity in
   process, advent of new process, overlap,
   paleoenvironments

Plan map (in envelop attached to back cover)

Cross section

Structure

Faults

Relation of field area to broader pattern of
   California tectonics

Geological history- main part of report as
   chronology of events

References

Appendices
In your Reader
Will be on Quiz
Course Material Fee covers transportation cost to the department

Class web site:
http://eps.berkeley.edu/~brimhall/EPS101_271/Website_EPS_101_271.htm

Lecture Notes: login: eps101
password: moraga4

Summary:
Buy your reader and bring it to Lecture every day for note taking
Leave your Reader and all valuables in your locker- Bring no valuables into the field as the trucks are no longer secure

Get your supplies ready for next Monday
Cut and paste the field book pages in your notebook by Lecture 2

Do the reading before each lecture, stay current, don’t miss class

Read the Reader ! Everyday   (Vick Copy)

Come to class prepared to learn and ask questions

Be on time to class and don’t miss classes
Be timely in the field and work safely
Fill out emergency form and email to me (see web site)
This is a challenging class that I want all students to enjoy
Map Preparation Steps

(1) Draw both cross section lines (A-A’ and B-B’) with a sharp pencil
(2) Trim off edges of map
(3) Cut along lines in interior part of map
(4) Tape backside with a 2 mm gap between all sheets

A dime can be used to set the declination and belt for your Brunton
Next lecture: Cash or Check for $21.95 made out to George Brimhall
Practice with your Brunton