GEOLOGY 3312/3112: “Geoscience Processes”
The University of Texas at El Paso       Department of Geological Sciences
Fall Semester 2018

Instructor:                               TAs:
Dr. J. M. Hurtado, Jr.                   Nathan Reade
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Class Website:
Check the web resources often for important class news and material!
http://www.geo.utep.edu/pub/hurtado/gsp

Class Meetings:
Lectures: T AND Th 9-10:20 am in Geology 123
Lab: T OR Th 12:30-3:20 pm in Geology 320 and some required weekend trips
Office Hours:
Dr. Hurtado: MW 1-3 pm in Geology 301a (or by appointment)
TAs: MW 11am-3pm in graduate student offices
Department Seminar: M 3:30-4:30 pm in Geology 123
In addition, see Department student club/association officers for information on meetings.

Text:
There is no required textbook to buy, but there will be required readings.

Readings from a variety of books will be given as PDFs available for download from the class website. These books include, but are not limited to:


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Copies of these books will be available to borrow for short periods of time from Dr. Hurtado. In addition, a large number of supplemental materials from a variety of other sources will also be provided as PDF readings for discussion throughout the semester.

**Grading:**

~20 lab/field trip/homework assignments (60%); 1 midterm examination (10%); 1 final examination (20%); lecture/lab/trip participation (10%)

Your participation/attendance will, in part, be evaluated based on a number of in-class quizzes. Some extra credit points from assignments, quizzes, etc. may be made available.

**Fieldwork:**

There will be short excursions to field localities on or close to campus during some of the Tuesday/Thursday laboratory times. There will also be several labs that will require more extensive travel off campus in (usually in UTEP vehicles) during lab and/or Saturday (see schedule). *All labs (especially the trips) are mandatory!* Talk to the Dr. Hurtado ASAP about any scheduling concerns! *It will be very difficult to accommodate make-ups for many of the trips!* Due to UTEP rules, we will all need to fill out insurance and release forms in class before our trips. Please consult Dr. Hurtado if you have health or other concerns about doing fieldwork.

Please be prepared when we go outdoors (e.g. have water, sunscreen, hat, good walking shoes, etc.)! Among the items you will need (e.g. they are required) for your field assignments are: a field notebook (*notebooks will be provided to you by the instructors*), handlens (*these will be provided to you by Dr. Goodell*), a clipboard, 1-cm grid graph paper, a sharp mechanical pencil, a fine-tipped ink pen, a metric scale ruler, a protractor, colored pencils, and a calculator. In addition, rock hammers and Brunton compasses will be available for your use on the days we need them (*no need to purchase these*). Talk to the Dr. Hurtado if you have any concerns about field equipment.

**Policies:**

Show up, show up on time, and show up prepared! Do reading and other assignments ahead of time, and come to class meetings with questions about what you read and about material from the previous class meeting. I expect everyone to contribute to class discussions and to be fully engaged in lab and in the field.

Attendance and class participation in both lecture and (especially) labs (particularly field trips!) are required. *I reserve the right to drop you from the course if you have excessive absences.* Please contact Dr. Hurtado about any

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Goals and Expectations:

From the UTEP catalog: GEOL 3312/3112 Geoscience Processes: Field-oriented, problem-solving studies emphasizing field identification of rocks; study of landforms and processes that create them; use of maps, aerial photographs, and satellite imagery; skills used in geologic mapping and field work. Emphasis on developing observational and analytical skills and the development of multiple working hypotheses. Prerequisite: Junior standing in Geology* or permission of instructor.

*Note that this usually means having taken “Physical Geology” and “Historical Geology”. Also note that you should be taking both “Geoscience Processes” and Mineralogy together during the same semester! We will often be doing joint assignments, lectures, and field trips between the two courses. In addition, both courses are prerequisites for all other courses in the Geology program, and the two courses are only offered once per year. Talk to your advisor if you have questions!

I hope to teach you how to describe geologic materials and processes in the field and in the laboratory, and – equally important – how to record those observations in a meaningful way. Specifically, we will cover the following topics and skills:

1. Use of a topographic map for navigation and recording of spatial data.
2. Construction and use of topographic maps, topographic profiles, stratigraphic columns, and geologic maps.
3. Use of a Brunton compass for measuring geologic structures.
4. Use of a geologic map and aerial imagery in the field.
5. Keeping an organized and complete field book.
6. Basic concepts and analytical tools used in structural geology.
7. Visualization of geologic data and relationships in three-dimensions.
8. Analysis of crosscutting relationships.
9. Identification and description of common rocks, minerals, soils, and other geologic materials.
10. Identification and interpretation of tectonic, volcanic, geomorphic and other landforms/structures.
11. Survey of fundamental concepts in plate tectonics, geophysics, historical geology, structural geology, petrology, sedimentology, geomorphology and other topics.

Ideally, you will learn to operate as a scientist when solving problems: asking questions; making careful observations; thinking critically and quantitatively about those observations; developing multiple working hypotheses; and testing those hypotheses. Part of this will involve working cooperatively and communicating your ideas to others. Most importantly, you must learn to be honest with yourself and trust your own observations.

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Course Outline:

Note that the details of our schedule are subject to change as the semester progresses. Please be flexible, and let Dr. Hurtado know if you have any questions or concerns, in particular scheduling conflicts with weekend field trips or with alternate scheduling of lab/lecture times on T and Th.

Schedule Notes:

1. There will be no class meetings (lab or lecture) on the following days: Nov. 23 (Thanksgiving). In addition, Dr. Hurtado may be called out of town for field work or other business on certain days – this, however, DOES NOT imply that class will be cancelled on those days! Unless you are otherwise notified, always assume class will meet, regardless of whether Dr. Hurtado is out of town!

2. Note that on some weeks, our normal lecture and lab schedule may be altered somewhat. For example, since we share/trade-off times with the mineralogy class, on some TTh you may meet exclusively with one class or the other all day.

3. Note the dates of field trips. Some field trips will occur during class/lab time. Sat. field trips will take most, if not all, of the day. We will leave UTEP by 8 am or so and return by 5 pm or so. During those weeks when there is a Sat. field trip (or no lab assignment at all), we will still use the TTh lab times for class, in addition to the normally scheduled lectures.
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<tr>
<th>Week</th>
<th>Dates</th>
<th>Topics and Labs</th>
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| Week 1 | Aug. 28, 30 | Introduction; Earth Materials  
Lab 1 (T): The Campus Andesite  
(On-campus field trip w/ mineralogy, T afternoon, all students)  
Lab 2 (Th): Rocks & Minerals (ALL students meet w/ Dr. Goodell) |
| Week 2 | Sept. 4, 6  | Basic Geologic Principles; Observational and Field Science  
Finish Lab 2 (normal TTh lab times/sections; meet w/ Dr. Goodell) |
| Week 3 | Sept. 11, 13 | Geologic Time; Earth History  
Lab 3 (T): Transmountain Road*  
(Off-campus field trip, all day T, all students – details TBA)  
Lab 4: Stratigraphic Principles & Crosscutting Relationships (HW) |
| Week 4 | Sept. 18, 20 | Topographic Maps; Fieldwork Basics  
Lab 5 (TTh): Map and Compass Basics Exercises  
(In-class, on campus field trip, T and Th pm) |
| Week 5 | Sept. 25, 27 | Geologic Maps; Fieldwork Basics  
Lab 6 (TTh): Indoor Mapping Exercise |
| Week 6 | Oct. 2, 4   | Earth Structure; Geophysical Concepts  
Lab 7 (TTh): Fitness Center Mapping  
(In-class, on campus field trip, T and Th pm) |
| Week 7 | Oct. 9, 11  | Plate Tectonics  
Lab 8 (TTh): Virtual Reality Sandbox |
| Week 8 | Oct. 16, 18 | Plate Tectonics; Structural Geology  
Lab 9 (T): Mt. Cristo Rey Mapping I*  
(Off-campus field trip, all day T, all students – details TBA) |
| Week 9 | Oct. 23, 25, 27 | Metamorphism  
Midterm Examination (in class on T)  
Lab 10: Bishop’s Cap Mapping*  
(Sat., all-day, off-campus field trip, all students – details TBA) |
| Week 10 | Oct. 30, Nov. 1 | Volcanism & Igneous Processes  
Lab 11: Structural Geology (HW) |
| Week 11 | Nov. 6, 8, 10 | Earthquakes, Active Tectonics, and Geologic Hazards  
Lab 12: Faults and Volcanoes in the Field in the Potrillo Mts.  
(Sat., all-day, off-campus field trip, all students – details TBA) |
| Week 12 | Nov. 13, 15 | Sedimentary Processes; Hydrology  
Lab 13: Orogenesis & Plate Tectonics (HW, GE) |
| Week 13 | Nov. 20     | Sedimentary Processes; Aeolian Processes  
Lab 14 Cristo Rey Mapping II*  
(Off-campus field trip, all day T, all students – details TBA) |
| Week 14 | Nov. 27, Nov. 29, Dec. 1 | Surface Processes & Geomorphology  
Lab 15: Minerals in the Field at Orogrande*  
(Sat., all-day, off-campus field trip, all students – details TBA) |
| Week 15 | Dec. 4, 6   | Surface Processes & Geomorphology  
Lab 16: Surface Processes (HW, GE) |

**Final Exam (scheduled by UTEP):** Tues., Dec. 11, 10 am – 12:45 pm in Geology 123

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