Geos 101 – The Dynamic Earth

Lectures: Mon., Wed., Fri. – 10:30 AM – 11:30 AM – REIC 201B
Labs: Tues., 9:45 AM – 12:45 PM, 6:00 – 9:00 PM; Wed., 11:45 – 2:45 PM, 6:00 – 9:00 PM; Thurs., 5:20 – 8:20; Tues., 2:00 – 5:00 PM (Honors) – REIC 230

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Required text: Jordan, T.H. and Grotzinger, J., 2012. **The Essential Earth.** Brooks/Cole, Belmont, CA, 735 p.

Other required materials: Geos 101: The Dynamic Earth Laboratory Manual

Introduction:

The Earth is a dynamic planet that is constantly changing. Physical geology is concerned with understanding the processes that operate at or beneath the surface of the Earth, and the materials on which those processes operate. An understanding of these processes and materials is essential for finding and utilizing Earth's resources, for occupying our planet in an environmentally responsible manner, and for responding to natural changes at the Earth's surface. The goals of this course are to understand and identify common minerals and rocks, to understand the structure and composition of the Earth, to understand basic processes on and within the Earth and how these relate to resources (including water!), and to view the Earth as a dynamic system.

Attendance:

A university classroom is an adult environment and, therefore, attendance at lectures is entirely up to you. However, it is unlikely that you will perform well in this class without attending lectures. It is strongly recommended that you attend all labs and class sessions.

TEACHING STRATEGY

Our focus is on 'teaching by doing'—focusing on lab exercises. In lecture, we will present information related to doing the pre-lab exercise and being prepared for a given laboratory exercise. The advantage of attending lecture is you will both understand the relevance of, and be better prepared for, the upcoming lab. Reading assignments (see attached syllabus) accompany each lecture. **You will find it helpful to at least look over the reading assignment <u>before</u> the appropriate lecture.**

You (the student) will do the pre-lab exercise both to acquire the background and to show us how well you understand the background to the lab. This allows us to spend the laboratory period **doing** the lab exercise rather than lecturing about it.

Depending on the lab, you may finish it all in the lab period, or you might need to write up an overview question later, after lab. Finally, to make sure that you understand the topic we present in lab and lecture, you will do a homework problem that will be due after you've completed the laboratory exercise for the associated topic. There are no quizzes or mid-term exams in this class because you will be continuously showing us that you do understand each topic – or where you need help.

To *pass this course*, you will need to complete --in a timely manner--12 (of 13) homework exercises, 12 (of 13) laboratory exercises, and a FINAL EXAM. YOU MUST ATTEND THE SECOND and FOURTH LABS (FIELD TRIPS). These field trips are critical because this is where you really **see** the relevance of what we've presented concerning geology and the Earth.

We encourage you to work in groups for the labs (if you enjoy doing so) but to use your own words and to NOT copy anyone else's work!!!! Please refer to the Student Code of Conduct on page 52 of the 2013-2014 UAF Catalog (http://www.uaf.edu/catalog/catalog_13-14/pdf/04_Academics.pdf). **We will take disciplinary action if you copy someone else's work**.

If you have a documented disability that requires additional time on homework assignments or labs, or if you require other accommodation, please let us know within the first two weeks of the semester. The Office of Disability Services implements the Americans with Disabilities Act (ADA), and ensures that UAF students have equal access to the campus and course materials. We will work with the Office of Disabilities Services (203 WHIT, 474-7043) in order to provide reasonable accommodation to students with disabilities. The key is that if you are having problems in the class, see us ASAP and we will try to help you.

LABS

The first labs will meet the week of September 9-13, 2013 (i.e. next week!). Written laboratory reports from a given week are due at the start of the following week's lab. A weekly "pre-lab exercise" is due IN LECTURE at the start of class each Monday, and is worth 10% of the lab grade (i.e. lab=90 + pre-lab=10 for a total score of 100). The purpose of the pre-lab is to get you ready for the lab exercise; the reason for turning it in at Lecture is to give the TAs a chance to go over them and see where you need help before the lab starts. **For each pre-lab question, if you do not know the answer and cannot figure it out from the readings, please write down what you do not understand so that we can go over it in the lab.**

Additional notes concerning Labs:

1. Plan to bring your lab manual, **a pencil**, paper, and a calculator to each lab session.
2. You can make up a missed lab **if and only if** you have notified your TA before the lab you will miss and arrange at that time when you will do it. Some labs require extensive set-up and your TA may not be able to prepare a lab especially for you on short notice.
3. It is possible to attend the "wrong" lab section **with approval** from the appropriate TA, however make sure that you are registered for the lab time that you attend most often.
4. We will make every attempt to promptly return graded lab and homework exercises; consequently, we cannot accept materials turned in grossly late...
5. Lab sections are **3 hours long**. We have designed these labs to run the full time for students who have done the pre-lab and have read the lab manual. If you aren't prepared it's likely to take you SIGNIFICANTLY longer than 3 hours. Please come prepared.

HOMEWORK

Homework exercises are assigned on Friday and are due the following **Friday at the start of lecture**. We urge you to set aside a regular time each week to work on homework and pre-lab assignments. The assignments are designed so that you can work on them over the weekend. The due date is such that you will have an opportunity to consult with your TA or the instructor about the homework exercise.

Grades:

As stated above, you must complete 12 of the 13 homeworks and 12 of the 13 labs. This gives you the opportunity to miss a week or to drop your lowest grade. YOU MUST ATTEND LABS 2 and 4 since they contain a field trip component. All lab reports and homework assignments must be handed in by December 13 (last day of class) unless you have made prior arrangements with your TA.

12 homeworks	25% of grade
12 labs (including pre-labs)	65% of grade
Final Exam	10% of grade

Late Policy: Any lab report handed in after the due date will be docked 10%. Lab reports handed in after the graded assignment has been returned to the rest of the class will be docked 50%. [Exceptions: documented illness, etc.; If in doubt, talk to one of us.] Lab reports not submitted will receive a grade of 0%, even if you attended the lab. Remember that the lowest lab grade will be dropped, so if you miss one deadline, don't worry too much.

Plagiarism Policy: It's fine to work with other students, but you must use your own words in answering a question. **If two or more students hand in essentially identical lab exercises, we will investigate and probably give at least one of the students a score of 0%.**

General grading guidelines/predictors (what you can do to earn a grade in this class)

A = All required homework, prelabs, and lab reports turned in on time and done to a high level.
B = All required homework, prelabs, and lab reports turned in (most on time) with good quality answers.
C = All required lab reports turned in, but some with low grades. Missing or poor quality homework.
D = Attend all labs, but missing a couple of lab reports, poor quality or missing homework.
F = Failure to attend labs, turn in lab reports and homework.

We will be using the +/- grading option to better evaluate borderline cases.

Field Trips:

The second and fourth labs of the semester consist of a local field trip component. These trips will give you a chance to examine rocks and minerals in their natural environment and will provide you with an appreciation for the types of rocks and geologic structures in and around Fairbanks. Be sure to wear appropriate clothing – e.g. sturdy shoes or boots, a warm jacket and/or raincoat (just in case!) depending on weather. The field trips will "go" regardless of weather. Attendance on the field trips is mandatory and a "missed" field trip lab cannot be made up in later weeks.

Questions:

There is no such thing as a foolish question. If you don't understand what any Geos 101 instructor or TA is saying, PLEASE ask for clarification. Chances are someone else in class or lab isn't understanding either! If you're not comfortable asking questions in class, please ask after the lecture or send an e-mail or drop by the appropriate office so we can clear up any confusion. That's what we are here for!

Tentative Lecture Schedule

Date	**Lecture/Lab Topic**	**Reading**
September 6 (F)	Introduction to the course	Chpt. 1, p. 2-36
Week of Sept. 9-13	**Lab #1** – Mineral properties and identification	
September 9 (M)	Mineralogy: identification	Chpt. 4 – p. 107-112

September 11 (W)	Mineralogy: the basics	Chpt. 4 – p. 94-102
September 13 (F) **Homework 1 due at start of class**	Mineralogy: structures	Chpt. 4 – p. 102-107
Week of Sept. 16-20	**Lab #2** – Mineral compositions, colors, ages	
September 16 (M) **Pre-lab 2 due at start of class**	From sediment to sedimentary rocks	Chpt. 6 – p. 179-184; 190-205
September 18 (W)	Sedimentary Environments	Chpt. 6 – p. 184-189
September 20 (F) **Homework 2 due at start of class**	Weathering	Chpt. 6 – p. 177-179
Week of Sept. 23-27	**Lab #3** – Rocks, folds and faults	
September 23 (M) **Pre-lab 3 due at start of class**	Geologic time and relative sequence of events	Chpt. 8 – p. 248-259
September 25 (W)	Radiometric dating and absolute ages	Chpt. 8 – p. 259-265
September 27 (F) **Homework 3due at start of class**	Soils & Paleosols	
Week of Sept. 30 – Oct. 4	**Lab #4** – Sedimentary Rocks	
September 30 (M) **Pre-lab 4 due at start of class**	Folds and ductile deformation	Chpt. 7 – p. 219-222
October 2 (W)	Faults, fractures and brittle deformation	Chpt. 7- p. 212-219; 223-226
October 3 (F) **Homework 4 due at start of class**	Igneous rocks	Chpt. 5 – p. 132-138
Week of Oct.7-11	**Lab #5** – Igneous rocks and processes	
October 7 (M) **Pre-lab 5 due at start of class**	Magma and intrusive igneous rocks	Chpt. 5 – p. 139-152
October 9 (W)	Volcanoes, lava and extrusive igneous rocks	Chpt. 5 – p. 152-168
October 11 (F) **Homework 5 due at start of class**	Metamorphic Rocks	Chpt. 7 – p. 232-236
Week of Oct. 14-18	**Lab #6** – Metamorphic rocks and processes	

October 14 (M) **Pre-lab 6 due at start of class**	Metamorphic Processes	Chpt. 7 – p. 226-231
October 16 (W)	Metamorphic Processes	Chpt. 7 – p. 236-240
October 18 (F) **Homework 6 due at start of class**	Earthquakes	Chpt. 13 – p. 425-439; 447-464
Week of Oct. 21-25	**Lab #7** – Earthquakes and seismic waves	
October 21 (M) **Pre-lab 7 due at start of class**	Seismology and structure of Earth's interior	Chpt. 13 – p. 440-446
October 23 (W)	Earth's magnetic field	Chpt. 2 – p. 54-56
October 24 (F) **Homework 7 due at start of class**	Paleomagnetism and continental drift	Chpt. 3 – p. 63-67
Week of Oct. 28-Nov. 1	**Lab #8** – Earth magnetism and faults in Alaska	
October 28 (M) **Pre-lab 8 due at start of class**	Plate Tectonics: the history of an idea	Chpt. 3 – p. 67-79
October 30 (W)	Tectonics: plates and plate boundaries	Chpt. 3 –p. 80-87
Nov. 1 (F) **Homework 8 due at start of class**	Topographic Maps	
Week of Nov. 4-8	**Lab #9** –Topographic Maps	
November 4 (M) **Pre-lab 9 due at start of class**	Geologic maps and structures	
November 6 (W)	Making Earth	Chpt. 9 – p. 271-282
November 8 (F) **Homework 9 due at start of class**	Earth History	Chpt. 9 – p. 287-310
Week of Nov. 11-15	**Lab #10** – Geologic Maps and Structures	
November 11 (M) **Pre-lab 10 due at start of class**	Mass wasting	
November 13 (W)	Wind and deserts	Chpt. 12 –p. 386-390
November 15 (F) **Homework 10 due at start of class**	Wind and desert processes and landforms	Chpt. 12 – p. 415-420
Week of Nov. 18-22	**Lab #11** – Air photos and remote sensing	

November 18 (M) **Pre-lab 11 due at start of class**	Oceans and ocean processes	Chpt. 12 – p.404-414
November 20 (W)	Rivers and deltas I	Chpt. 12 – p. 391-400
November 22 (F) **Homework 11 due at start of class**	Rivers and deltas II	Chpt. 12 – p. 400-402
Week of Nov. 25-29	**Thanksgiving – no labs**	
November 25 (M)	Groundwater: fundamentals	Chpt. 11 – p. 353-370
November 27 (W)	Groundwater: chemistry and karst	Chpt. 11 – p.371-380
November 29 (F)	**Thanksgiving Break – no classes**	
Week of Dec. 2-6	**Lab #12** – Groundwater hydrology	
December 2 (M) **Pre-lab 12 due at start of class**	Glaciers	Chpt. 10 – p. 335-342
December 4 (W)	Glaciers: erosion and deposition	
December 6 (F) **Homework 12 due at start of class**	Ice ages and permafrost	Chpt. 10 – p. 342-347
Week of Dec. 9-13	**Lab #13** – Glacial geology	
December 9 (M) **Pre-lab 13 due at start of class**	Global Change	
December 11 (W)	Global Change – a geological perspective	Chpt. 9 – p.287-310
December 13 (F) **Homework 13 due at start of class**	Alaskan Geology, Petroleum and Mineral Deposits	Chpt. 1 – p. 4-27
December 16 (M)	**FINAL EXAM** **Final essay due**	Final Exam period (10:15 a.m.- 12:15 p.m.)

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