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, 2:00 – 5:00 PM (Honors); Wed., 11:45 – 2:45 PM, 6:00 – 9:00 PM; Thurs., 5:20 – 8:20 PM – REIC 230

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Required text: Monroe, J.S. and Wicander, R., 2009. **The Changing Earth: Exploring Geology and Evolution.** 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'-- lab and homework 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 and homework assignments (see attached syllabus) accompany each lecture. **You will find it helpful to at least look over the reading assignment before 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 midterms 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 the Final Essay. YOU MUST ATTEND THE SECOND and FOURTH LABS (FIELD TRIPS). The 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 49 of the 2010-2011 UAF Catalog. **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 6-10, 2010 (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. **If you do not turn in the exercise IN LECTURE, your grade for the lab will be "docked" 10 points (out 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

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 about the homework exercise.

HOMEWORK HELP SESSION: SUNDAYS 2 – 5, ROOM 230 (THE LAB)

If you are missing more than 2 homeworks or labs prior to drop date (September 17) or withdrawal date (October 29) you will receive (copy to your advisor) a written request to drop the course. We may exercise the option to drop you from the course if you've done minimal work, but don't count on it unless you don't mind getting an 'F'.

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 the lowest grade. YOU MUST ATTEND LABS 2 and 4(FIELD TRIPS). All homework and lab reports, and the Final Essay must be handed in by 10:15 AM December 17.

12 homeworks	--	30% of grade
12 labs	--	65% of grade
Final Essay	--	5% of grade

Late Policy: Any lab report or homework handed in after the due date will be docked 10%. Homework or 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 one lab and

one homework 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 or homework 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 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 02 (F)	Introduction to the course	Chpt. 1, p. 3-12
Week of Sept. 06-10	**Lab #1** – Mineral properties and I. D.	
September 06 (M) **Pre-lab 1 due start of LAB**	**Labor Day – no classes**	

September 8 (W)	Mineralogy: identification	Chpt. 3 – p. 74-81
September 10 (F) **Homework 1 due**	Mineralogy: the basics	Chpt. 3 – p. 61-68
Week of Sept. 13-17	**Lab #2** – Mineral compositions, colors, ages	
September 13 (M) **Pre-lab 2 due at start of class**	Mineralogy: structures	Chpt. 3 – p. 68-73
September 15 (W)	Geologic time & relative sequence of events	Chpt. 17 – p. 436-449
September 17 (F) **Homework 2 due**	Radiometric dating and absolute ages	Chpt. 17 – p. 449-465
Week of Sept. 20-24 **Pre-lab 3 due at start of class**	**Lab #3**– 3 major rock types – Field trip	
September 20 (M)	Weathering	Chpt. 6 – p. 134-142
September 22 (W)	From sediment to sedimentary rocks	Chpt. 6 – p. 147-156
September 24 (F) **Homework 3 due**	Sedimentary Environments	Chpt. 6 – p. 156-163
Week of Sept. 27 - Oct. 01	**Lab #4** – Sedimentary rocks & processes	
September 27 (M) **Pre-lab 4 due at start of class**	Folds and ductile deformation	Chpt. 10 – p. 246-252
September 29 (W)	Faults, fractures and brittle deformation	Chpt. 10- p. 252-257
October 01 (F) **Homework 4 due**	Igneous rocks	Chpt. 4 – p. 92-97
Week of Oct. 04-08	**Lab #5** – Igneous rocks and processes	
October 04 (M) **Pre-lab 5 due at start of class**	Igneous rocks	Chpt. 4 – p. 97-103
October 06 (W)	Magma and intrusive igneous rocks	Chpt. 4 – p. 86-92
October 8 (F) **Homework 5 due**	Volcanoes, lava and extrusive igneous rocks	Chpt. 5 Chpt. 7 – p. 175-179
Week of Oct. 11-15	**Lab #6** –Metamorphic rocks & processes	
October 11 (M) **Pre-lab 6 due at start of class**	Metamorphic Rocks	Chpt. 7 – p. 175-179
October 13 (W)	Metamorphic Processes	Chpt. 7 – p. 168-175
October 15 (F) **Homework 6 due**	Metamorphic Processes	Chpt. 7 – p. 179-185
Week of Oct. 18-22	**Lab #7** – Earthquakes and seismic waves	
October 18 (M) **Pre-lab 7 due at start of class**	Seismology and structure of Earth's interior	Chpt. 8 – p. 211-218
October 20 (W)	Earth's magnetic field	Chpt. 2 – p. 35-36
October 22 (F) **Homework 7 due**	Paleomagnetism and continental drift	Chpt. 2 – p. 30-38
Week of Oct. 25-29	**Lab #8** –Understanding topographic maps	
October 25 (M) **Pre-lab 8 due at start of class**	Tectonics: plates and plate boundaries	Chpt. 2 – p. 39-56
October 27 (W)	Tectonics: crustal dynamics	

October 29 (F) **Homework 8 due**	Topographic Maps	
Week of Nov. 01-05	**Lab #9** – Geologic maps and structures	
November 01 (M) **Pre-lab 9 due at start of class**	Geologic maps and structures	
November 03 (W)	Making Earth	Chpt. 1 – p. 12-17
November 05 (F) **Homework 9 due**	Making Earth	Chpt. 1 – p. 17-24
Week of Nov. 08-12	**Lab #10** –Earth magnetism & faults in Ak	
November 08 (M) **Pre-lab 10 due start of class**	Earthquakes	Chpt. 8 – p. 190-211
November 10 (W)	Mass wasting	Chpt. 11
November 12 (F) **Homework 10 due**	Wind and deserts	Chpt. 15 –p. 390-400
Week of Nov. 15-19	**Lab #11** – Air photos and remote sensing	
November 15 (M) **Pre-lab 11 due start of class**	Wind and desert processes and landforms	Chpt. 15 – p. 384-390; 400-403
November 17 (W)	Oceans and ocean processes	Chpt. 9; Chpt. 16
November 19 (F) **Homework 11 due**	Rivers and deltas I	Chpt. 12
Week of Nov. 22-26	**Thanksgiving – no labs**	
November 22 (M)	Rivers and deltas II	Chpt. 12
November 23 (W)	Soils and Paleosols	Chpt. 6 – p. 142-146
November 27 (F)	**Thanksgiving – no classes**	
Nov. 29-Dec. 03	**Lab #12** – Groundwater hydrology	
November 29 (M) **Pre-lab 12 due start of class**	Groundwater: fundamentals	Chpt. 13 – p. 330-335
December 01 (W)	Groundwater: chemistry and karst	
December 03 (F) **Homework 12 due**	Glaciers	Chpt. 14 – p. 358-364
Week of Dec. 06-10	**Lab #13** – Glacial geology	
December 06 (M) **Pre-lab 13 due start of class**	Glaciers: erosion and deposition	Chpt. 14 – p. 364-380
December 08 (W)	Ice ages and permafrost	Chpt. 14 – p. 376-379
December 10 (F) **Homework 13 due**	Global Change	
December 13 ((M)	Global Change – a geological perspective	
December 17 (F)	Geologic Evolution of Alaska/Mineral Resources and/or Class assessment/Instructor Feedback	Final Exam period (10:15 a.m.- 12:15 p.m.)