

GEOLOGY 246: GEOMORPHOLOGY

FALL 2007



Professor **Laura Triplett**

Office: Nobel 131; x7442

ltriplett@gustavus.edu (< one t!)

Office Hours: 10:30-11:30 a.m. MWF, or by appointment

*Note that I will not be on campus most Tuesdays.

Teaching Assistant

Lecture 9:00 – 9:50, MWF, Nobel Hall, room 121

Lab All lab sessions meet in Nobel 125
Section 246-003 2:30 – 5:20 W
Section 246-004 2:30 – 5:20 Th

Textbook Easterbrook, Surface Processes and Landforms, 2nd Edition

COURSE DESCRIPTION AND GOALS

We live on the thin surface of the earth, which is the interface between the hard rock of our planet and the comparatively wild environment of the atmosphere. Geomorphology is the study of how the earth and the atmosphere interact: that is, how ice, water, tectonics, wind, etc. shape the landforms we see around us. We can learn about the geologic past by studying those

landforms, and we can learn about the geologic future by understanding how those landforms will continue to change and thus affect our society.

The goals of this course are to:

- Understand how the environment shapes the earth surface
- Apply critical-thinking and reading skills to real-world problems
- Use first-hand observations of the world to develop and test hypotheses
- Be able to use primary and secondary literature to help answer geologic questions
- Clearly communicate scientific concepts to others.

In this course, we will spend the most time on the two most important forces that have shaped Minnesota's landscape over the past million years: glaciers and rivers. We will also explore how wind, ocean tides and currents, tectonics, gravity (i.e. landslides) and human activities shape the planet. The best way for you to experience geomorphology is to get out and see it for yourself, so we will have several labs "in the field" and a one-day fieldtrip on a weekend in October. You will also conduct a small, original research project during the semester, with significant guidance and support from your classmates and me. Finally, you will present the results of your research to the class, because the ability to communicate clearly and concisely is a critical, though often overlooked, skill for scientists to have.

GENERAL INFORMATION

Because this course is cross-listed for geology, geography and environmental studies, I expect a variety of backgrounds in geoscience or environmental studies among students in this class. All of you have taken either introductory geology or physical geography, and material in this course builds upon those backgrounds (there is broad overlap among the topics covered in these two courses). If a particular subject calls upon detailed knowledge of only geology or geography, I will review it briefly in lecture but *you may need to consult an introductory textbook for more information*.

I expect that the lecture and lab environments will be informal but learning intensive. If you cannot attend a lecture or lab, please let me know in advance (email: ltriple@t.gustavus.edu or phone: x7442).

Take notes, read the textbook, and ask questions to make this course as interesting as possible. I strongly encourage you to keep a list of questions at the back of your notebook, then find the answers through discussion with your peers or by coming to my office hours to talk through complicated topics.

My office hours and location are listed at the top of the syllabus. I am happy to make appointments to meet at other times. In addition, if I am in my office and the door is open, please feel free to stop in! You can also check to see if I'm in my lab. I will not be on campus on Tuesdays, but I check email often.

COURSE POLICIES

Mutual respect:

I will start and end class on time, strive to make class time engaging and productive, make assignments and exams fair and reasonable, return assignments and exams in a timely manner, and be accessible outside of class to answer questions or help with projects. In return, I expect you to be ready to start class on time, to let me know as soon as possible if you will miss class or lab, turn in assignments on time, to be alert and responsive in class and lab, and to work together with your classmates to further each other's learning experience.

Late assignments:

I place a high premium on turning in labs and assignments on time. Late assignments will be docked 10% per day, with a maximum late period of three days. On the other hand, I am sympathetic to physical and mental illness if you are under a doctor's care, and in such cases will work with you develop alternate plans.

Academic honesty:

Scientific advancement is based on trust, so to make this world better for humanity and for yourself and please be worthy of that trust. I have a zero tolerance policy for cheating and academic dishonesty. If you cheat on an exam, plagiarize the work of another person, or present work that is not entirely yours as if it was, you will automatically receive a zero for that assignment and will be referred to the college's office of academic advising. Repeated or serious instances of academic honesty may result in failure of the course.

Scientific advancement is also based on cooperation, but always with the understanding that each person will receive due credit for their contribution. Although some assignments will be done in groups, you are responsible for submitting your own, original answers unless otherwise indicated. If you have any questions or concerns, PLEASE ASK ME or refer to the policy of Gustavus: http://gustavus.edu/academics/general_catalog/current/index.cfm?pr=acainfo
As a student of Gustavus, you implicitly agree to abide by this honor policy, and I will assume that the work you do is your own until I am given reason to suspect otherwise.

Disability:

I will make every effort to accommodate any physical, mental and learning disabilities that my students may have. Some aspects of this class involve moderate levels of physical exertion, but I will make as many changes as I am able, if necessary. Please talk to me as early as possible if you have any concerns about your ability to succeed in this class! Following is the college's policy, to which I adhere completely.

“Section 504 of the Rehabilitation Act of 1973 and the Americans with Disabilities Act (1990) work together to ensure ‘reasonable accommodation’ and non-discrimination for students with disabilities in higher education. A student who has physical, psychiatric/emotional, medical, learning or attentional disability that may have an effect on the student's ability to complete assigned coursework should contact the Disabilities Services Coordinator in the Advising Center,

who will review the concerns and decide with the student what accommodations are necessary. Disability Services Coordinator Laurie Bickett (x6286) can provide further information.

COURSE REQUIREMENTS AND GRADING

Grading: Your final grade will be determined by:

<i>Lecture exams (3)</i>	<i>30% (10% each)</i>
<i>Lab</i>	<i>30%</i>
<i>In-class activities</i>	<i>15%</i>
<i>Research Project (including proposal report and presentation)</i>	<i>25%</i>

Lecture exams: There are three semester exams. They will cover material presented in lectures and reading assignments. Each exam is cumulative, but will focus on material covered after the previous exam. Most exams will consist of problems and short answer questions. **BRING A CALCULATOR.** The “final exam” is scheduled for Thursday, Dec. 20, 10:30-12:30 in our regular classroom. This will be the third of the 1-hour exams.

Labs: Some labs will be done in the field, others will be done in our lab room. In all cases, it will be difficult to “make up” a missed lab, so please plan to attend all lab sessions. Due dates for lab assignments are firm and will be listed at the top of each assignment (usually due at the beginning of lab the following week). Most lab exercises will require a brief (up to one page) essay as part of your final report. The basis for grading these will be content, organization and style. I will offer detailed comments on your writing and expect that it will improve throughout the semester. Finally, although the lab portion of this class is technically worth only 30% of your grade, you will not pass the course if you fail the lab portion.

Lab notebook:

I encourage you to have a separate lab notebook for this portion of the class. A lab notebook is small enough to take in the field, and keeps all of your observation and research notes in one place. Lab notebooks come in various formats, and several styles are sold at the Bookmark for under \$3.

Lectures and In-Class Activities: Be prepared by showing up on time, paying attention and taking notes during lecture, and staying current on reading assignments.

- I use a variety of class participation exercises and feedback activities to gauge your understanding as well as my teaching effectiveness. These activities include such things as minute-long writing assignments at the end of class, short homework assignments to be used in upcoming classes, and class discussions and debates. Most of these activities will not be graded with a letter grade, but instead I will give you a ‘yes’ or ‘no’ mark for participation.
- Other “in-class activities” will include assigned reading in geoscience journals. These articles will supplement lecture and the textbook, and are designed to help you think critically about research in geomorphology. Some articles will be discussed in-class or in-lab, and you will sometimes be asked to submit a written summary or analysis

Research Project: You will conduct a small-scale, original research project in an area of geomorphology. This may be done individually or with one partner. The project will involve data collection, analysis and interpretation that can be done in a relatively short time frame. You will spend some time individually and as a class developing your project ideas and goals. You will write your results as a brief research report following a specific format and guidelines that I will provide to you. Also, you will present your research in “conference talk” format during the last lab session of the semester. This is a large part of your grade and is, I think, the best way for you to experience geomorphology. Therefore, I am devoting a significant amount of class time and lab time to working with you, and letting you work together, on this project. I hope that you will take full advantage of that time and my availability.

Field Trip: A one-day field trip to observe the geomorphology of Minnesota (and/or possibly Wisconsin) will be held on a date to be determined. Information presented on the trip will greatly improve your understanding of glacial geomorphology and it will be covered on the exams.

Extra Credit: Attend lectures and lab sessions, keep up with reading assignments, ask questions, and hand in your work on time. If you do all of this, you will succeed in this course and won't have time or need for extra credit.

COURSE EVALUATION

There is an entire science about learning, yet most college students are expected to magically figure out how to be good learners (and teachers!) on their own. Throughout the semester I will invite you to evaluate your own progress in the class and tell me what I can do to better help you learn. Some of these evaluations will be very informal and some will be more formal, thought-provoking assignments. All of these activities will be ungraded, but I hope you will take them seriously and that they will help you with future courses as well.

OTHER RESOURCES

I will maintain a Moodle page, but will not depend on it too much because we have such a small class and we spend so much time together, anyway. Important things that **WILL** be posted on Moodle:

- Syllabus, including updates of assignments, due dates, etc., as the semester progresses
- Links to other online resources that may help with your studying and research
- Maps, articles, etc. that we discuss in class and that you may want to explore further

To access Moodle, go to :

<http://moodle.gac.edu/>

Login with your Gustavus username and password, then click on GEO 246 in the Course Categories section on the bottom left of the screen. (I think!)

LECTURE AND LAB SCHEDULE

I apologize that we are jumping around in the textbook; I know that that can be annoying to students, and may be potentially confusing if the textbook author refers to subjects that we temporarily skipped over. However, I have structured the class so to maximize our outdoor field time early in the semester and also to quickly introduce geomorphic processes that are most important in Minnesota in order to help you develop good ideas for your research projects.

Week of	General class topic for the week	Lab location*	Lab title	Textbook assignment	Other Assignments and Exams
9/4	Course intro, and Fluvial	Lab	Visualizing the 3-D Landscape	Introduction and Ch. 5	
9/10	Fluvial	Field*	Stream Gauging at Rush River	Ch. 5	
9/17	Fluvial	Lab	River Trends and Analysis	Ch. 6	- Scientific article assignment due 9/24 in class Guest lecture on 9/21
9/24	Groundwater, and Project design	Field	Sediment Transport	Ch. 7	
10/1	Mountain glaciers and landforms	Lab (W) Field (R)	W: Glacial Landforms R: Glacial Deposits	Ch. 12	EXAM 1: FRIDAY 10/5 Extra reading handouts: part of Ritter chapter, and Patterson article
10/8	Continental glaciers and landforms	My office	<i>Individual meetings regarding your project proposals</i>	Ch. 13	- Project proposals due at individual meetings during lab time (10/10 or 10/11) Extra reading handout: GSA Today article

Week of	General topic	Lab location*	Lab subject	Textbook assignment	Other Assignments and Exams
10/15	Lakes Quaternary climate and the ice ages	Field (W) Lab (R)	W: Glacial Deposits R: Glacial Landforms	Ch. 14	
10/22	Humans as geomorphic agents	Lab	Humans on the Landscape	<i>* Readings for this topic will be distributed in class *</i>	- Read fieldtrip packet by 10/28
10/29	Rock weathering and soil formation.	Field	Weathering: Our Fading History	Ch. 3	EXAM 2: FRIDAY 11/2
11/5	Tectonic geomorphology: Isostasy and weathering	Lab	Wood You Believe This	Ch. 15	- Project bibliography and update due 11/9 in class
11/12	Mass wasting: Landslides, slumps and sags	Lab	The Piles	Ch. 4	
11/19	Presenting scientific data	----	<i>NO LABS: THANKSGIVING</i>		
11/26	Coastal processes: Beaches, capes, barrier islands and Katrina	Lab	The Beaches are Moving	Ch. 16	- Scientific article assignment due 11/30 in class
12/3	Eolian processes and landforms	Lab	<i>Preparing your project reports and presentations</i>	Ch. 17	
12/10	In-class project presentations, and Course synthesis	Lab	<i>tba</i>	Ch. 18	Project reports due 12/10 at 9:00 a.m. (in class)
	Final hour exam is on Thursday, Dec. 20, 10:30-12:30, in Nobel 121				EXAM 3: THURSDAY 12/20

Textbook reading summary:

Ch. 5: 97-105, 108-137

Ch. 6: 145-147, 149-156, 162-172

Ch. 7: 186-206, 208-211

Other assigned readings:

Part of Atchafalaya chapter from McPhee

Tornqvist et al. "Comment" in Science

Carrie Patterson's "Introduction to MN Glaciations"

Part of chapter from Ritter (Process Geomorphology) on glacial movement