

## GEOG/GEOL 312: GEOMORPHOLOGY

Dr. K. A. Lemke  
Office: Science B345

klemke@uwsp.edu  
Phone: 715-346-2709

### WHY STUDY GEOMORPHOLOGY?

Geomorphology involves study of the characteristics, origin and development of landforms.



The Southern Alps, Queenstown, New Zealand

Have you ever seen a breath-taking landscape and wondered how something that beautiful came to exist? Or perhaps you've seen several very different, but equally inspiring landscapes and wondered why all places do not look the same? The landscape in Wisconsin is very unlike the landscape in Hawaii or the landscape in Alaska. Why? In fact, we don't need to travel that far to see differences in the landscape – the steep hills and valleys of southwestern Wisconsin look quite different from the flat landscape of central Wisconsin, which is quite different from the pocked, irregular landscape of northern Wisconsin. One reason for studying geomorphology is to satisfy our innate curiosity about the natural world around us, in particular the surface forms of the earth, our home.

Another reason for studying geomorphology is more practical. The characteristics of the landscape affect the way we live. For example, the flat landscape of central Wisconsin is covered by a porous layer of sand that although good for growing potatoes and beans, requires irrigation despite the fact that natural precipitation is sufficient for growing these crops. How water drains from the landscape is an important aspect of geomorphology. How soils form is an important aspect of geomorphology. Both water and soil are important for our survival; we need water to drink and soil in which to grow our food.

Many people have moved to the west coast of North America in part for the scenery. In addition to water and soil characteristics, people living there also need to worry about landslides that may destroy their homes. The stability of the land surface is an important aspect of geomorphology. We need stable surfaces on which to build our homes. These are

examples of applied geomorphology – the use of geomorphological knowledge for planning, engineering, and safety concerns related to human settlements.

Another reason for studying geomorphology is to help us understand what conditions on earth may have existed in the past. Climate change is a hot issue in current events these days. How can we be sure that the climate is changing? If we can figure out whether the climate of the earth has always been like it is today or whether it's changed over time, that knowledge can help us predict how the climate might change (or not) in the future. One way to determine past climatic conditions is to study the landscape. What types of landforms are associated with different climatic conditions? Wisconsin again provides a good example. Every time you walk or drive around central, northern or eastern Wisconsin, the landscape you see is a glacial landscape; the landforms are glacial landforms but we certainly don't have a glacial climate here today. Without knowledge of geomorphology, you might not realize that some landforms we see today are the result of processes no longer at work on the landscape due to things such as climate change.

These are just a few reasons for studying geomorphology. There are plenty more: ecologists need to know about geomorphology in order to understand why certain plants or animals thrive where they do; river restoration efforts require an understanding of the natural processes that shape river channels and how those processes interact with aquatic ecosystems; environmental engineers studying pollution sources and sinks need to understand geomorphological processes to determine how pollutants got to be where they are or to predict where pollutants might potentially end up in the future. So whether you simply want to know how that beautiful mountain landscape was created or whether you're more interested in how we live on and in the land, the study of geomorphology is important.



Glacial deposits, Wisconsin.

## COURSE OBJECTIVES

There are two key objectives in this course. The first objective, typical for a traditional geomorphology course, is to learn the characteristics of landforms, how those landforms are created and subsequently modified. This approach covers many landforms but not much detail about any one set of landforms or processes. Because of the second objective, we will not cover the entire array of landforms or processes covered in a traditional geomorphology course.

The second objective is to engage in a detailed examination of fluvial geomorphology for the purpose of learning how geomorphologists go about their work. We will experience how the scientific method is applied in the discipline of geomorphology by engaging in a field and laboratory project that will occupy the first half of the semester.



## COURSE OUTCOMES: You should be able to:

- 1) explain how water, weathering, ice and gravity modify and shape the landscape;
- 2) describe characteristics of landforms produced by water, weathering, ice and gravity, and identify examples of these landforms in photos, on topographic maps, and in real life;
- 3) measure and calculate landform characteristics such as height, slope and width from topographic maps and stereo air photos, and draw topographic profiles;
- 4) use appropriate field and laboratory methods and instruments to measure stream characteristics;
- 5) calculate stresses and forces working on the landscape, explain the meaning of your calculated values, and relate these values to landscape characteristics; and,
- 6) apply the scientific method in geomorphology and communicate your findings orally and in writing.

## CONTACT INSTRUCTOR

### Office Hours – Science B345

Tuesday and Thursday 10:00-11:00 and by appointment.

Email – [klemke@uwsp.edu](mailto:klemke@uwsp.edu)

## CLASS POLICIES

### Attendance

You are expected to attend lecture. Lectures are scheduled Tuesday and Thursday 9:00-10:00 AM in Science D320. Lecture material may not duplicate material in the textbook and is generally required for successful completion of assignments and lab exercises. We will spend time in lecture working on assignments and engaging in discussions. Everyone is expected to participate in these activities.

You are required to attend lab, Monday 9:00-11:00 AM, in Science D320 or D326. Lab activities for the first half of the semester involve team work. Your presence is required for effective teamwork. Lab activities for the second half of the semester may require you to use equipment available only during the lab period.

There are two required field trips (the UWSP Catalog states that field trips may be required). The first field trip is a full-day trip to collect data on the Tomorrow River and will occur on the second or third Friday of the semester. The data from this field trip will form the foundation for the remaining lab activities for the first half of the semester, thus, it is essential that everyone participate in this field trip. The second field trip is a 2-hour tour of glacial landforms in Portage County that will take place during the regular lab period. There will be no make-up field trips.

You are responsible for all material covered in class. If you miss a class, even for a legitimate reason, you are still responsible for the material covered. It is your responsibility to get notes from a fellow student.

### Preparation

You are expected to prepare for class. As a general rule, you should spend approximately two hours outside of class preparing for every hour of class. Since this is a three-credit class, that translates to six hours of preparation outside of class every week. Preparation for class entails reading the textbook, working on assignments or lab exercises, reviewing and working through lecture notes, and any other study activities that will help you learn the material.

Our textbook, Ritter, D.F., R.C. Kochel and J.R. Miller (2011) *Process Geomorphology*, 5<sup>th</sup> ed. McGraw Hill, NY, is available as a rental text at the university bookstore. Do assigned readings before coming to class and asking questions as you go –do I understand this? Why is it important to geomorphology? When and how might I use this information? How does this information relate to other information we've discussed in class?

### Participation

You are expected to participate in class by asking questions and contributing observations or comments during lecture. You are expected to contribute to any class and small

group discussions. You are required to participate in lab work, whether team-based or individual. Failure to participate may negatively impact your grade.

### Cell Phones and Electronic Devices

Talking on cell phones, texting, checking for messages, emailing, watching videos and listening to music during class is not allowed. It is rude and distracting to other students in the class and to the instructor. Laptops and tablets are allowed with prior permission from the instructor.

### Student rights and responsibilities

UWSP has specific guidelines regarding student rights and responsibilities, academic standards and disciplinary procedures, accommodation of religious beliefs, and conduct on university land. The UWSP Student Handbook and the Dean of Students web page explain these guidelines and are available at: <https://www.uwsp.edu/dos/Pages/handbook.aspx> and <https://www.uwsp.edu/dos/Pages/default.aspx>.

## EVALUATION AND GRADING

Your grade is based on homework assignments, lab exercises, exams, and class participation, weighted as follows:

Assignments, participation, quizzes	30%
Labs	40%
Exam 1	15%
<u>Exam 2</u>	<u>15%</u>
Total	100%

I do not assign grades, you earn grades. Letter grade cut-offs are as follows:

A	93–100%	C+	77–79%
A–	90–92%	C	73–76%
B+	87–89%	C–	70–72%
B	83–86%	D	60–69%
B–	80–82%	F	below 60%

### Assignments and Quizzes

Assignments and quizzes allow you to practice working with material discussed in lecture. They often include mathematical calculations followed by questions asking you to interpret or explain the importance and implications of your calculated values. Other assignments or quizzes may provide opportunities to practice identifying landforms in photos, diagrams and on topographic maps. Some assignments include questions from readings. You are expected to make a concerted effort to complete all assignments before coming to class. You will have opportunities to ask questions and confer with classmates prior to submitting assignments and quizzes. You are expected to consult with your peers – a

form of participation – by either asking questions or answering questions. Everyone must submit their own assignment; as a general rule, assignments are not group projects. Quizzes may be individual or group-based. Late assignments will incur a 10% grade penalty. Assignments will not be accepted once the final deadline has passed except for extenuating circumstances.

### Participation

You are expected to contribute constructively to class and small-group discussions. You are expected to ask for help when needed and to contribute help when you are able. You are expected to contribute your fair share of work on all team projects. Failure to participate may result in a grade penalty.

### Lab Activities

Activities include field work, lab work, map-work, calculations, writing, and oral presentations. Lab activities are designed to give you experience applying the scientific method in geomorphology and to develop skills required for working in the field of geomorphology.

About half of the lab activities involve group work. Group projects are graded based on the quality of the work submitted. The grade assigned to the finished project, however, may not necessarily be the grade that each individual member of the group receives. *Each member of the group will receive an individual grade* based in part on the quality of the submitted assignment and in part on their individual contribution to the finished assignment. After completing group assignments, each student must fill out an evaluation form assessing the contributions from each member of their group, *including themselves*. Your peers should not be punished for your failure to do an equal share of the work and you should not be punished for the failure of other group members to do their share of the work. You should be rewarded for whatever work you actually do. As a result, *all members of a particular group may not receive the same grade for a particular lab assignment*.

The remainder of the lab activities are individual activities. In these cases, you are allowed to work with other students on the activities, but each student must submit their own lab exercise. You may discuss answers with other students, but you still need to write your own answers to the questions. No credit will be awarded for answers that have been copied verbatim from another student.

Failure to hand in lab exercises on time will result in a 10% grade penalty. Labs will not be accepted once the final deadline has passed except for extenuating circumstances.

### Exams

Exams are 2-hours long; the mid-term will take place during a lab session and the final exam will take place dur-

ing finals week. Exams consist of a mixture of short answer questions, landform identifications on diagrams, maps or photos, and mathematical calculations (be sure to bring a calculator!). Mathematical formulas will be provided as part of the exam. It is more important that you understand when and how to use a formula, and how to interpret the results, than it is to memorize the formula.

There will be no multiple choice questions. Preparation for exams consisting of short answers is different from that required for multiple choice tests. On a multiple choice test, you just need to be able to recognize the correct answers. On a short answer test, you need to pull all the necessary information out of your head. Be sure to adjust your study sessions accordingly. In addition, your writing skills count on

a short answer test, not just your knowledge of the topic. Both exams will be open note and open book.



Your instructor and her dog Mica (far left) exploring the geomorphology of the Delaware Water Gap, PA.