

GEOGRAPHY 140A

Physical Landscapes: Process and Form

U.C. Berkeley, Spring 2020

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GEOGRAPHY 140A (4 credits)

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Class Lectures: MW 2:10–3:30 in 145 McCone

- + Additional pre-requisite bonus lecture: Monday, January 27, 5:10 p.m.
- + As needed, make-up lectures, probably Mondays at 5:10 p.m.

Regular Office Hours:

Mondays 3:30–5 in 525 McCone, excepting weeks of faculty meetings.
Also by appointment if necessary.

Required Materials:

1. Parts of text: *Global Geomorphology*, M. Summerfield
2. Map: *Landforms of the United States*, E. Raisz
3. Outline of class notes

Many optional additional readings are available in the Earth Sciences Library in the basement of McCone Hall. I recommend:

Two informative books about geomorphological processes:

1. Ritter, Kochel and Miller: *Process Geomorphology* (3rd ed.)
2. Anderson and Anderson: *Geomorphology: The Mechanics and Chemistry of Landscapes*

Two books about tectonics:

1. Kearey, Klepeis, and Vine: *Global Tectonics* (3rd ed).
2. Condie: *Plate Tectonics and Crustal Evolution* (4th ed)

Google is very useful, as are world atlases (the Earth Sci. library has good ones).
Use these resources proactively!

What is GEOGRAPHY 140A?

Physical Landscapes: Process and Form

This course concerns: the physical surface of the earth: its form, the processes that shape it, and its capacity for change.

The discipline is casually called "Geomorphology," a legacy term. "Earth Surface Processes and Landforms" is better descriptor.

Why you should be here and alert:

1. The earth's surface is our home. It is in our interest to be good tenants.
 - need to understand pathways for, and possible consequences of, change; need to understand natural disasters; paths to sustainability
2. Geography as the science of interactions:
 - geomorphology is an important facet of the people/environment interface
 - inextricable links to biology and climate
3. Geography as sense of place, a dimension analogous to historical time.
 - physical landscapes are unique and often beautiful, and people have to adapt to them. Can you separate Switzerland from the Alps or New Orleans from the bayous, river and delta?
 - You tour around a landscape (whether by air or ground). You see things. Why do you see what you see?

What constitutes explanation?

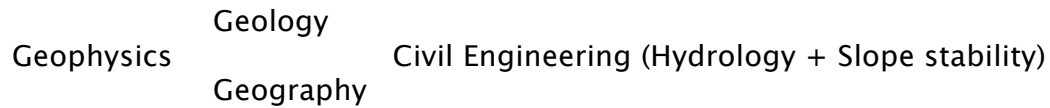
Although describing and cataloguing are important (and we will do some of this) we need to go way beyond these and ask "why? ".

→ Seek explanation in root causes.

* Requires information from a host of disciplines (geology/chemistry/physics/biology), all of which are building blocks for physical geography.

Geomorphology is a crossroads.

Geomorphology sits within and between four disciplines in particular:



Geomorphology also taught at Berkeley in the Earth and Planetary Science Department (Prof. Dietrich). Both rely deeply on an understanding of **process**: this is at the core of answering the "why" questions, and questions of evolution over time (e.g., response to human activities, or climate change). The EPS course is much more about the actual practice of geomorphology. The geography course is a conceptual overview.

Also overlap with courses about water: esp. Prof. Larsen (Geography)

Geog 140A, outline of topics covered:

1. brief overview: the geomorphological machine
2. a quick look at essential ingredients
3. global tectonics and relation to landscapes: making relief
 - A. Why there is plate tectonics and isostasy
 - B. Plate boundary landscapes
 - C. Plate interior landscapes
 - D. Volcanism
4. river-hillslope systems: attacking and propagating relief
 - A. river systems as conveyors of water
 - drainage networks
 - discharge hydrographs
 - channel hydraulics
 - B. hillslopes
 - weathering and soils
 - transport vs. production limitation
 - hillslope transport processes
 - C. river systems as conveyors of sediment
 - transport processes
 - magnitude-frequency concepts
 - mass conservation consequences
 - channel types
 - longitudinal profiles and terraces

Geog 140B (taught some fall semesters ☺☹).

Coasts, deserts, karst, glacial and periglacial landscapes, and Physiography (+ field trip!)

GEOGRAPHY 140A Grading

This standard scale will be used as a minimum:

99–100 A+, 94–98 A, 90–93 A–
87–89 B+, 84–86 B, 80–83 B–
77–79 C+, 74–76 C, 70–73 C–
67–69 D+, 64–66 D, 60–63 D–
< 60 F

I will curve scores if I think it fair. A curve can only help your grade: I will not bring grades below the standard scale.

TO EARN YOUR GRADE:

- (1) First graded exercise: **20%**
(Handed out in class on **Wednesday, February 19**, take-home:
Due at start of class on **Monday, February 24**)
- (2) Mid-term exam (**Monday March 16**, in-class) **35%**
- (3) Cumulative Final Exam **in final exam period 45%**
(probably Tuesday May 12, will confirm when possible)

☺ Exams are good. They are your opportunity to really learn the material. ☺

On exams, you are responsible only for material covered in lectures, except as specially noted. Other resources are to provide more illustrations and data, and a more complete and terminology-intensive presentation, for those interested.

Pre-requisite bonus lecture: **Monday, January 27, 5:10 p.m.**

- Topics: 1. Stress, strain, strain rate, buoyancy, density
2. Types of rocks