

# GEOMORPHOLOGY

THE STUDY OF THE EARTH'S SURFACE  
*COURSE SYLLABUS*

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*A Survey of Geomorphology, including lectures on:*  
LANDFORMS AND PROCESSES  
NEOTECTONICS AND TECTONIC LANDFORMS  
VOLCANOES AND VOLCANIC PROCESSES  
WEATHERING AND EROSION  
GEOHYDROLOGY and FLUVIAL PROCESSES  
DESERT LANDFORMS AND EOLIAN PROCESSES  
THE 'ICE AGES' and GLOBAL CLIMATE CHANGE  
PERIGLACIAL and GLACIAL GEOMORPHOLOGY  
ENERGY FLOW IN GEOMORPHIC SYSTEMS  
LANDFORM EVOLUTION  
MASS WASTING and EROSION  
NATURAL HAZARDS  
GEOMORPHIC PROVINCES OF THE WORLD

**Professor: James Begét**  
**Dept. Geology and Geophysics**  
**364 Natural Science Building**

**Fall 2007**

**GEOS 304 Geomorphology**

Course Information                      GEOS 304  
Credits:                                      3  
Place:                                        235 NCSI  
Time:                                         Tu/Th 9:45-11:15

Instructor: Dr. James Begét (Jim)  
Office:                                        Natural Science Building 364  
Phone:                                        474-5301  
Office Hours:                                Wednesday 9-12..(also by appointment)

Textbook: Bloom, A. L. 2004. Geomorphology (3<sup>rd</sup> edition)  
Waveland Press, Illinois, USA

Course Introduction:

Geomorphology is the scientific study of the geologic history, processes, and features found at the surface of the earth. Geomorphology approaches these questions through studies of the origin and characteristics of the earth's landforms, such as mountains, lakes, lava flows, fault scarps, beaches, terraces, moraines, etc.

The origin of the various landscapes and features on the earth's surface is a fundamental question. The earliest known writings on natural science, in the 4<sup>th</sup> century BC by Aristotle and Herodotus, include observations of geomorphology and related natural phenomena. Geomorphology was an important part of the earliest scientific work done by Leonardo da Vinci and others during the Renaissance, and by Darwin, Humboldt, J. W. Powell, and others during the scientific exploration of the earth during the 16-20<sup>th</sup> centuries.

Today, a diverse suite of landforms has been described from all parts of the earth's surface. However, the exploration and discovery of new landforms and surface features continues on the planets and moons of our solar system.

Modern geomorphology focuses on the types and rates of processes which create and modify landforms. These studies have "real-world" applications in evaluating climate and environmental change and natural hazards.

This course will survey the landforms of the world, analyze the processes which operate in particular climates or tectonic settings to produce distinctive landforms, and discuss how geomorphology can be used to evaluate climate change and natural hazards in Alaska and other areas.

Course Goals:

- 1) Identification of landforms throughout the world.
- (2) Introduction to modern methods of study of landforms, Quaternary sediments, and the physical processes which modify the earth's surface.
- (3) Applications of geomorphology and surficial geology to natural hazards evaluations, engineering geology, land-use planning, economic geology, archeology, paleoecology, paleoclimatology, and other earth science problems.

Course Format:

Material will be presented in a lecture format. Slides and powerpoint shows will be used to illustrate landforms and processes. Class discussion and participation is encouraged. Readings from the text supplement the lecture material and are required. Several "mini-labs" during the term will introduce students to geomorphologic data. A few films will be shown. A guest lecture or two is possible.

Field Trips

Geomorphology is a field science. There will be a required one-day field trip in late September, and we will use one class period to look at geomorphic features around the UAF campus.

Assigned Readings:

Sections of the textbook are assigned each week in the syllabus. The readings are keyed to class lectures. You should try to read the text before the lecture. Exam questions will come from both the readings and lecture.

Class Exercise (mini-labs):

Several short exercises will be completed during the term. These "mini-labs" are designed to demonstrate fundamental concepts. You will need a pocket calculator for some exercises.

Examinations and Grading:

There will be three examinations, each covering one-third of the term, and each counting 30% of the grade. Exams will cover lecture, readings, and in-class exercises. Exams will not be cumulative. If you know ahead of time that you must miss an exam, or if you miss an exam because of an emergency I will give you an alternate exam during the next lecture. In addition to the 90% of a student's grade based on the objective scores on the exams, 10% will be based on completion of 3 of the 4 in-class mini-labs (the class fieldtrip counts as a mini-lab).

**LECTURE OUTLINE AND ASSIGNED READING**

**PART ONE: CONSTRUCTIONAL PROCESSES**

<u>Date</u>	<u>Lecture Topics</u>	<u>Assigned Reading</u>
<b>SEPTEMBER 6</b>	Organization Meeting, syllabus	3-12B
11	Syllabus Scope of Geomorphology History of Geomorphology Constructional processes	19-34B
13	Neotectonic landforms, processes	
18	continued	35-48B, 67-87B

	20	Tectonic geomorphology Constructional landforms, Faulting and folding	
	25	Paleoseismology, hazards	
	27	Neotectonics/ Alaskan seismic hazards	
	29	Geomorphology Field Trip—Fairbanks area	
<b>OCT.</b>	2	intro volcanic geomorphology	92-113B
	4	Volcanic landforms, Volcanic processes	
	9	Mt. St. Helens./AK. volcanoes	


OCT 11                      First Examination

**PART TWO: WEATHERING/SURFICIAL PROCESSES**

	16	Chemical weathering	117-146B
	18	chemical weathering	
	23	Physical weathering Physical weathering (continued)	
	25	soils, karst	147-168B
	30	mass wasting landslides, rockfalls	169-188B
<b>NOV.</b>	1	Hillslope morphology progressive evolution	188-195B
	6	Fluvial processes	13-16B, 198-227B
	8	Fluvial landforms	231-274
	13	Paleohydrology, flood hazards	
Nov	15	Second mid-term examination	

**PART THREE: SURFICIAL PROCESSES---CONTINUED**

	20	Shoreline processes	417-442B,
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Nov	23	THANKSGIVING HOLIDAY	
	27	Shoreline landforms	445-459B
	29	Eolian-arid processes Eolian landforms	p. 324-330S; 277-305B p. 331-340S
<b>DEC</b>	4	Loess in Fairbanks/global climate change	
	6	Periglacial processes Periglacial landforms	p.388-397S; 309-322B p. 397-405S
	11	Geomorphology of glaciers ice sheets & valley glaciers	p. 417-429S p. 353-372B
	13	Glacial Geology Glacier landforms	p. 430-467S; p. 373-390B p. 468-492S
	TBD	Final Examination	

MERRY CHRISTMAS, HAPPY WINTER HOLIDAY, AND A HAPPY NEW YEAR!!!

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