

Spring 2021

Geomorphology

Charles M. Shobe
West Virginia University

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COURSE SYLLABUS

GEOL 321/GEOG 321

Geomorphology

Course Introduction

Overview: Geomorphology is “the science of scenery,” or the study of why Earth’s surface looks the way it does and how it changes over time. This course focuses primarily on *geomorphic processes*, or the mechanisms by which mass is eroded, transported, and deposited. We will journey across Earth’s surface, studying geomorphic environments ranging from waterfalls to landslides to glaciers. We will also spend time looking at applications of geomorphic concepts like river restoration and natural hazard prevention.

Credit Hours: 3

Prerequisite Courses: (GEOL 101 and GEOL 102) or (GEOL 110 and GEOL 111) or (GEOG 110 and GEOG 111)

Instructor: Charles (Charlie) Shobe, Assistant Professor of Geology

Class Meets:

Date and time: Tuesday/Thursday 1:00 pm - 2:15 pm

Location: Brooks Hall

Course Introduction:

Introduction to Earth surface processes and resulting landforms. Emphasizes the physics of erosion and sediment transport.

Faculty Contact Information

Instructor Office Location: Brooks G43

Office Hours:

Shobe: Wednesday 12:00 pm to 1:00 pm and by appointment

Instructor Email:

Shobe: cs00048@mix.wvu.edu

Course communication:

- All materials will be hosted in a Google Drive folder which you will have permission to access using your MIX account.
 - We will use Slack for course-related communication. I will post a link to join the Slack group in the Google Drive folder. Please use Slack before resorting to email.
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Instructional Materials

Required Instructional Materials:

There is **no required textbook** for this course. All materials (e.g., readings, problem sets) will be provided through Google Drive. I will provide a link to the course's Google Drive folder in eCampus.

Optional Instructional Materials:

Anderson and Anderson (2010) *Geomorphology: The mechanics and chemistry of landscapes*

Bierman and Montgomery (2020) *Key concepts in geomorphology* (2nd edition)

Course Learning Outcomes

Course Learning Outcomes:

A. Students learn units used to measure quantities important in Earth surface processes, and can convert between units. B. Students understand the global-scale controls on topography, including tectonics, climate, and Earth material properties. C. Students learn the processes active in different geomorphic domains, including hillslope, river, glacial, and periglacial environments as well as the imprint of various processes on topography. D. Students can use field and remote sensing data to infer dominant geomorphic processes. E. Students are familiar with the principle of mass conservation in a control volume, and can construct mass balances to assess the sign and magnitude of changes to Earth's surface. F. Students learn to analyze geomorphic data, including topographic data. G. Students can read the primary scientific literature in geomorphology, and digest the key points of papers. H. Students gain appreciation for the applicability of geomorphology to predicting and mitigating geologic hazards.

Assessment

Short Descriptions of and Grading Criteria for Major Assignments/Assessments:

- 1) **Narrative problem sets:** Problem sets that you will answer in short essay form using words, equation, and graphs. Think of them as [very] short scientific papers. There will be 11 narrative problem sets. They will be graded for a combination of completion (did you attempt every problem?), correctness (did you get the right answer and show how you got it?), and presentation (is the writing easy to follow? Are the calculations and graphs clear?). The worst grade will be dropped.
- 2) **Reading activities:** Every week there will be a short, 1-3 question quiz on the assigned reading. These will be graded for correctness. The worst grade will be dropped.
- 3) **In-class activities:** Short polls, quizzes, or worksheets, and will be graded for completion.

Weight/Distribution of Course Points:

- Narrative problem sets: 70%
- Reading quizzes: 20%
- In-class activities: 10%

Mid-Semester Grade:

Mid-semester grades will include the first four narrative problem sets and the first eight reading quizzes.

Response time and feedback plan:

Work will be graded in a timely manner. Narrative problem sets will be returned within one week.

Expected Timeline of Major Assignments/Assessments and Topics/Units:

- Readings are to be done prior to class; quizzes will take place in the class for which that reading was assigned. Problem sets are due before class unless told otherwise.
- NPS = Narrative Problem Set

Day	Date	Topic	Reading	Assignment due
Tue	1/19	Introduction		
Thu	1/21	Quantitative concepts	Reading 1	Reading quiz
Tue	1/26	Tectonics, climate, surface	Reading 2	Reading quiz
Thu	1/28	Tectonics, climate, surface		NPS 1
Tue	2/2	Runoff & channel initiation	Reading 3	Reading quiz
Thu	2/4	Runoff & channel initiation		NPS 2
Tue	2/9	River mechanics	Reading 4	Reading quiz
Thu	2/11	<i>No class</i>		
Tue	2/16	River mechanics	Reading 5	Reading quiz
Thu	2/18	Sediment transport		NPS 3
Tue	2/23	Sediment transport	Reading 6	Reading quiz
Thu	2/25	Channel shape & pattern		NPS 4
Tue	3/2	<i>No class</i>		
Thu	3/4	Bedrock channels	Reading 7	Reading quiz
Tue	3/9	Bedrock channels	Reading 8	Reading quiz
Thu	3/11	River landforms		NPS 5
Tue	3/16	Extreme floods	Reading 9	Reading quiz
Thu	3/18	Weathering		NPS 6
Tue	3/23	Hillslope Processes	Reading 10	Reading quiz
Thu	3/25	Hillslope Processes		NPS 7
Tue	3/30	Mass movements	Reading 11	Reading quiz
Thu	4/1	Mass movements		NPS 8
Tue	4/6	Glacial processes	Reading 12	Reading quiz
Thu	4/8	Glacial landforms		NPS 9
Tue	4/13	Periglacial processes	Reading 13	Reading quiz
Thu	4/15	Periglacial landforms		NPS 10
Tue	4/20	Landscape evolution	Reading 14	Reading quiz
Thu	4/22	Landscape evolution		NPS 11
Tue	4/27	Other places/other worlds	Reading 15	Reading quiz
Thu	4/29	Careers in geomorphology		

Final Grading Scale:

Percentage	Letter grade
93-100	A
90-92.9	A-
87-89.9	B+
83-86.9	B
80-82.9	B-
77-79.9	C+
73-76.9	C
70-72.9	C-
67-69.9	D+
60-66.9	D
<60	F

Course and Institutional Policies

Attendance Policy:

Attendance in class is mandatory. It will factor into your course grade through reading quizzes, in-class activities, and lab activities.

Participation Policy:

Lectures and labs will begin on time, so please be prompt.

Assignments are *due prior to the start of class* to the instructor, unless instructed otherwise. Assignments will be turned in through Google forms, and should be in PDF format unless specified otherwise.

Each student is responsible for completing their own work. You are encouraged to collaborate with and help one another and to use the resources available to you, including lecture material, the textbook, outside sources (internet, academic papers, other texts), unless otherwise noted. *Write names of collaborators at the top of each assignment.* Ultimately, your work should *not* be identical to work turned in by others.

All plots should have appropriate labels (with units) on all axes and a title or caption clearly describing what is plotted. All values should have units. All work should be shown on assignments and exams.

Late Assignment and Missed Exam Policy:

Each student starts the semester with three late days. These may be used at any time to delay turning in an assignment without a grade penalty. Once your three late days have been used, late assignments will be accepted at a penalty of 10% off the assignment per day.

Weekends and holidays are included as late days. For example: a narrative problem set was due on Thursday. Turning it in Friday would use one late day and incur no grade penalty. Turning it in the following Monday would use three late days and incur a 10% penalty.

Institutional Policies:

Students are responsible for reviewing [policies](#) on inclusivity, academic integrity, incompletes, sale of course materials, sexual misconduct, adverse weather, as well as student evaluation of instruction, and days of special concern/religious holiday statements.

Mental Health:

Mental health concerns or stressful events can adversely affect your academic performance and social relationships. WVU offers services to assist you with addressing these and other concerns that you may be experiencing. You can learn more about the broad range of confidential mental health services available on campus at the Carruth Center for Psychological and Psychiatric Services (CCPPS) website: <https://carruth.wvu.edu/>. If you are in need of crisis services, call the CCPPS main number 24/7: (304) 293-4431.