

SYLLABUS

GEOL 315: SURFACE AND NEAR-SURFACE PROCESSES

Spring 2019

MWF 10:50 – 11:40 am, Petigru 111

Instructor: Professor Scott White
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Office hours: Monday 12:00 - 12:45 pm or by appointment.

IA: Jacob Vincent
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Office hours: Monday and Wednesday 1:00-2:00 or by appointment

Lab Sections: 002. Tues 10:05-1:05 pm, EWSC 208
001. Th 2:50-5:50 pm, EWSC 208

No Required Text; Recommended texts (on reserve at TCL):

Key Concepts in Geomorphology. Bierman & Montgomery, 2014, Freeman.
Applied Hydrogeology (4th Ed.). C.W. Fetter, 2001, Prentice Hall.
Introducing Geomorphology, A. M. Harvey, 2012, eBook via USC library.
Fluvial Processes in Geomorphology, L. Leopold et al., 1964

Course Goals

This course will cover basic principles of hydrology and geomorphology. We will consider the movement of surface water, groundwater, and sediments, and investigate the interactions between water and sediments/rocks near Earth's surface. Students will also develop written communication skills through lab and homework assignments.

Learning Objectives

By the end of the course, successful students will be able to

1. Explain basic concepts in hydrology and geomorphology
2. Use mathematical expressions to solve problems in hydrology and geomorphology and present those solutions in a clear way
3. Use lab and field techniques to solve problems in hydrology and geomorphology
4. Collect, contour, and interpret spatial data (e.g. topographic data, water table maps)
5. Effectively communicate scientific concepts in written assignments

Topics

The Hydrologic Cycle

Infiltration, Evapotranspiration, and Runoff

Storms, Floods, and Stream Hydrographs

Stream Processes, Open Channel Flow
Mass Wasting
The hydraulic properties of sediments and rocks
Hydraulic head and Darcy's Law
Water supply and well tests
Basic concepts in groundwater contamination and remediation

Labs

The lab is designed to elaborate on topics introduced in the lectures, primarily through experiment, computation and fieldwork. Don't miss lab. These are hands-on experiences designed to get you through with guidance from your IA. Lab makeups will not be offered. Each lab is worth ~4% of your total course grade.

Course Requirements

Homework and in class assignments. Homework will be assigned on average every two weeks. Students will also work problems in class. This class is based on active learning.

Examinations. There will be three exams of equal weight, two midterms and final. Material on the exams will come from lectures, homework, and labs. Any topics covered in class may appear on an exam.

Labs. Labs meet every week. Attendance and participation is mandatory (see USC's attendance policy, 3 missed labs will result in a full letter grade reduction)

GRADING		POINTS	PERCENT
In-class work	(typically Friday)	50	12.5%
Homework	(~5 assignments)	50	12.5%
Exams	(3 at 40 pts each)	120	30%
Labs	(12 labs)	<u>180</u>	<u>45%</u>
		400	100%

Communication

Your instructors will send announcements via Blackboard. Make sure that you check the email that Blackboard uses for your address (I will send a test message the first week of class so you can confirm that your settings are correct.)

Academic Accommodations

The University of South Carolina provides high-quality services to students with disabilities, and we encourage you to take advantage of them. Students with disabilities needing academic accommodations should: (1) Register with and provide documentation to the Office of Student Disability Services in LeConte College Room 112A, and (2) Discuss with the instructor the type of academic or physical accommodations you need. Please do this as soon as possible, preferably within the first week of class. *All course materials are available in alternative format upon request*

The instructor reserves the right to change or modify the syllabus as needed to support the structure of the course. The course syllabus, schedule, and instructions for assignments will be posted to our Blackboard course. You are responsible for checking Blackboard on a regular basis for information on upcoming assignments and class meetings.

PROVISIONAL COURSE SCHEDULE

Week	Exams & Readings	When?	What?
1	Bierman & Mont. Ch. 1-2	14, 16, 18 Jan	Introduction, Earth Systems, Survey tools
2	Bierman & Mont. Ch 2	23, 25 Jan (Mon MLK Day)	Surveying, Hydro Cycle, GIS tutorial
3	Bierman & Mont. Ch 4	28, 30, 1 Feb	Precipitation, Infiltration Evapo-transpiration, Hydrographs, GIS
4	Leopold Ch 4 and Bierman & Mont. Ch 3 and 5	4, 6, 8 Feb	Mechanical and Chemical Weathering; Hillslopes
5	Bierman & Mon. Ch. 5	11, 13, 15 Feb	Slope material, Slide susceptibility, Angle of repose
6	Midterm 1: Fri Feb 22. Readings: Handouts	18, 20, 22 Feb	Mass Wasting, Hillslope Morphology
7	Leopold, Ch. 7	25, 27, 1 Mar	Fluvial channels, Sediment transport
8	Bierman & Mont. Ch. 7-8 and Leopold Ch. 5	4, 6, 8 Mar	Drainage Basins, Coastal Processes and Landforms
9	-	10-16 March	---- Spring Break ----
10	Fetter Ch 3	18, 20, 22 Mar	Hydraulic properties of rocks and sediments
11	Midterm 2: Fri March 29.	25, 27, 29 Mar (SE-GSA Th-Fr)	Hydraulic head, Darcy's Law
12	Handouts	1, 3, 5 Apr	Groundwater contamination
13	Fetter, Ch 5	8, 10, 12 Apr	Wells and water supply
14	Fetter, Ch 7	15, 17, 19 Apr	Regional groundwater flow
15	Leopold, Ch 3; Bierman & Mont. Ch 13	22, 24, 26 Apr	Climate and Hydrology
	Final Exam	3 May	Friday 9 am

PROVISIONAL LAB SCHEDULE

Week	Date	Lab
1	Jan 15, 17	Creating topographic maps
2	Jan 22, 24	Surveying (at the GQ)
3	Jan 29, 31	Stream Hydrographs (meet in computer lab, EWS 201)
4	Feb 5, 7	Landscape change 1: Mass Wasting Identification
5	Feb 12, 14	Landscape change 2: Distribution of Mass Wasting Events
6	Feb 19, 21	Landscape change 3: Models of Landslide Susceptibility
7	Feb 26, 28	Landscape change 4: Mass Wasting Risk Assessment
8	March 5, 7	
9	11 -14 March	No lab – spring break
10	Mar 19, 21	Measuring fluxes, flow and infiltration (at Rocky Branch)
11	Mar 26, 28	Rating curves at Congaree National Park
12	Apr 2, 4	Darcy's Law: Permeameters
13	Apr 9, 11	Wells at Congaree National Park (or GQ)
14	Apr 16, 18	Solute transport in the Ant Farm
15	Apr 23, 25	Rain Date