GEOG 331 | Geomorphology

Lecture: TR 11:10 AM–12:25 PM, CSA 303
Lab: W 11:30 AM–1:30 PM, TEAG B009A
Spring 2025, College Station, TX

Essential Information

Instructor

Dr. Andrew Moodie
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Office: OMB 803F
Phone: (979) 845-1786
Office hours: W 2:00–3:00 PM

Course Materials and Assignments

- Strongly Suggested Text:
  Anderson and Anderson, Geomorphology: The Mechanics and Chemistry of Landscapes, First Ed.
- All *required* course materials will be made available on Canvas
- Assignments and grades will be organized via Canvas
- 30% laboratory exercises, 50% exams, 15% readings discussion lead, 5% participation

Course Description

Principles and fundamentals of landform analysis. Laboratory work in advanced map interpretation. Credit Hours: 3. Prerequisites: GEOL 101 or GEOG 203.

Learning Objectives

By taking this course, students will be able to interpret the patterns of landscapes, and explain how such patterns arise and are maintained over time. Upon successful completion of the class, students will be able to:

- describe landscapes from mountainous terrain to coasts
- understand mathematical descriptions of processes and landscape evolution
- articulate the processes of sediment transport across a wide range of landscapes
- read and extract pertinent information from scientific papers, and synthesize new ideas about research

Course Structure and Grade

Lectures

Lectures are delivered in-person during the specified class time. On some occasions, lectures may be pre-recorded and posted to Canvas to allow for in-class time for other exercises. You will be responsible for all material covered in lectures, not just material included on the slides.

Materials and Assignments.

All course materials will be posted on the Canvas learning platform, and supplied on paper as deemed appropriate. Midterm exams will be taken in person during the regular scheduled class time, and the final exam will take place in person during the regularly scheduled exam period. Assignments and graded portions of the course are described below.

Course Grade

Lab Exercises – 30%

You will complete six laboratory activities during the scheduled lab time, throughout the semester. Some of these exercises will need to be completed after the scheduled lab time. Labs will be due on the Wednesday of the following week (i.e., one week later), unless otherwise noted.

6 exercises × 45 points + 1 exercise × 30 points = 300 points

Exams – 50%

You will complete in-class midterm exams and a final exam. Each exam will focus on material covered since the previous exam, but may require a cumulative understanding and integration of topics for success. Exams are to be completed independently and in person. Sharing or discussing exam content will be considered cheating and a violation of the academic integrity policies.

2 midterm exams × 150 points + 1 final exam × 200 points = 500 points

Participation – 5%

Your participation grade will be based on engagement during regular lecture periods. Your participation grade will not be based on the “correctness” of your questions or answers during lecture. You must engage in class to be successful in this aspect of the course.

50 points

Readings Discussions – 15%

There will be several class periods dedicated to discussing papers. You will sign up to collaboratively lead the discussion of two papers throughout the semester. Your grade will be based on your preparation to lead the discussion, timely submission of discussion questions when not leading (the day before at 12:00 pm noon), and depth of engagement with the assigned papers when *leading and participating* in the discussion. You must engage in the discussion to be successful in this aspect of the course.

150 points

Grade scale:
A: 900-1000 points (90-100%); B: 800-899 points (80-89%); C: 700-799 points (70-79%); D: 600-699 points (60-69%); F: below 600 points (<60%).
I reserve the right, but do not have the obligation, to curve individual components assignments, components, and/or cumulative course grades. I will never curve grades to your detriment.

Course Policies

Academic Integrity Statement and Policy

"An Aggie does not lie, cheat or steal, or tolerate those who do."

"Texas A&M University students are responsible for authenticating all work submitted to an instructor. If asked, students must be able to produce proof that the item submitted is indeed the work of that student. Students must keep appropriate records at all times. The inability to authenticate one's work, should the instructor request it, may be sufficient grounds to initiate an academic misconduct case" (Section 20.1.2.3, Student Rule 20).

You can learn more about the Aggie Honor System Office Rules and Procedures, academic integrity, and your rights and responsibilities at https://aggiehonor.tamu.edu.

All lectures and video content posted by the instructor are the intellectual property of the instructor and protected by copyright laws. Do not repost materials to other web sites or forums without the permission of the instructor.

All work submitted must be your own original work. Ideas and contributions of others must be appropriately acknowledged, and using an AI-content generator (such as ChatGPT) to complete coursework must be appropriately acknowledged. You may use AI to organize your thoughts and edit your writing in this course, but ideas and writing should be your own first. If you are unsure about whether something may be plagiarism or academic dishonesty, please contact your instructor to discuss the issue.

Grade Disclosure

All personal information concerning your performance in this course is covered by federal privacy legislation, known as the Family Educational Rights and Privacy Act of 1974 (FERPA). No grades or status questions will be provided by telephone or email. Grades will be provided via Canvas.

Due Dates

All assignments are to be submitted by the end of the day (11:59pm) on the specified due date, unless otherwise noted. Assignments will be submitted via Canvas, and time stamped upon submission. It is your responsibility to get assignments turned in on time.

Late assignments will be accepted up to one week after the due date. After the due date, assignments will receive a deduction of 20% percent of the maximum grade. Three days after the due date, assignments will receive a deduction of 50% percent of the maximum grade. This policy does not apply to discussion questions, which must be submitted on time or will receive a zero.

In the case of a University excused absence, please speak to the instructor to establish an appropriate due date. See *Makeup Work Policy* below.

Attendance Policy

The university views class attendance and participation as an individual student responsibility. Students are expected to attend class and to complete all assignments.

Please refer to Student Rule 7 in its entirety for information about excused absences, including definitions, and related documentation and timelines.

Makeup Work Policy

In the case of excused absences, students must email the instructor within one week of an excused absence in order to make arrangements to make up missed assignments. In order to make-up an assignment, you must have official documentation for the excuse (e.g. a doctor's note). You must contact the instructor or TA upon submission of the late assignment.

Students will be excused from attending class on the day of a graded activity or when attendance contributes to a student's grade, for the reasons stated in Student Rule 7, or other reason deemed appropriate by the instructor.

Please refer to Student Rule 7 in its entirety for information about makeup work, including definitions, and related documentation and timelines.

Absences related to Title IX of the Education Amendments of 1972 may necessitate a period of more than 30 days for make-up work, and the timeframe for make-up work should be agreed upon by the student and instructor (Student Rule 7, Section 7.4.1).

"The instructor is under no obligation to provide an opportunity for the student to make up work missed because of an unexcused absence" (Student Rule 7, Section 7.4.2).

Students who request an excused absence are expected to uphold the Aggie Honor Code and Student Conduct Code. (See Student Rule 24.)

Office Hours

When: Wednesdays 2:00–3:00 pm, Dr. Moodie's office, OMB 803F
Office hours are a time when you can speak with the instructor about questions about course content, grades, or any other specific concerns regarding the course that cannot be easily

answered in an email. Office hours will be held in person, unless otherwise noted (on Zoom). If the office hours do not work with your schedule, please contact the instructor. If you need to speak privately with the instructor, please contact the instructor.

Communication

Please contact the instructor through the Canvas communication tools, or by email at amoodie+331@tamu.edu. If you do not receive a response within 2 business days, please follow-up again. The instructor may not respond to emails or messages outside of normal business hours. Important information regarding the course may be shared via the announcements section on Canvas. It is your responsibility to regularly check the announcements and to follow any relevant instructions.

Classroom Diversity and Climate

Supporting Equity

The College of Arts & Sciences aims "to live by our Aggie Core Values and make our college, campus and community an inclusive and welcoming place for all. Together, we:

- foster a culture that values and respects the diverse backgrounds, experiences and perspectives of our students, staff and faculty.
- Engage a diverse and inclusive community in cross-disciplinary and world-class research, teaching, and outreach.
- Identify and remove barriers that affect the academic and professional success of individuals from minoritized or underrepresented groups.

Valuing diversity means we include, welcome, and support individuals with varied characteristics, experiences and backgrounds. We do not discriminate on the basis of race, color, national or ethnic origin, religious or spiritual identity, gender identity or expression, disability, age, sexual orientation, and veteran status (https://artsci.tamu.edu/about/equity-inclusion/index.html).

Engagement with course material and other students is always shaped by individuals' intersecting identities and personal experiences. This class seeks to treat these differences as an asset to our collective learning experience, providing a space for all students to interpret and share understanding of course content from myriad perspectives. Be respectful of the different experiences, beliefs and values expressed by your fellow students and instructor, and refrain from derogatory and generalizing comments about other individuals, cultures, groups, or viewpoints.

We will discuss social issues, economics and politics frequently in this class. Some of them will be things that are commonly mobilized in ways to divide and anger people. You have a responsibility in this class to consider how your statements will be received by others. Statements that disregard the humanity of others will not be tolerated. When faced with differing

opinions, all students are expected to remain respectful of their classmates. Personal attacks or insults to entire groups of people undermine the ability of others to learn in the class, and will not be tolerated. These expectations of courtesy extend to any discussions of course material on Canvas or other platforms used in the course.

This class supports the Texas A&M University commitment to Diversity, and welcomes individuals of all ages, backgrounds, citizenships, disabilities, education, ethnicities, family statuses, genders, gender identities, geographical locations, languages, military experience, political views, races, religions, sexual orientations, socioeconomic statuses, and work experiences (https://diversity.tamu.edu/).

Names and Pronouns

If you would like to make me aware of a preferred name or pronoun that differs from your university registration, please use this form: https://forms.gle/QCkk1bv1XHSzGBQ99. You will simply provide your UIN, preferred name, and pronoun.

Reporting Concerns

If you feel that you are experiencing discriminatory or racist behavior in this class, please inform me. You may inform me of these concerns, misconduct by students, or concerns with course material by contacting me directly or submitting an anonymous note using this form: https://forms.gle/uzxKHsp73qHP2hSs5. You may also report any concerns about hate or bias to https://stophate.tamu.edu.

Americans with Disabilities Act (ADA) Policy

Texas A&M University is committed to providing equitable access to learning opportunities for all students. If you experience barriers to your education due to a disability or think you may have a disability, please contact Disability Services in the Student Services Building or at (979) 845-1637 or visit https://disability.tamu.edu. Disabilities may include, but are not limited to attentional, learning, mental health, sensory, physical, or chronic health conditions. All students are encouraged to discuss their disability related needs with the instructor as soon as possible; I encourage you to seek and use accommodations you are entitled to.

Title IX and Limits to Confidentiality

Texas A&M University is committed to fostering a learning environment that is safe and productive for all. University policies and federal and state laws prohibit gender-based discrimination and sexual harassment, including sexual assault, sexual exploitation, domestic violence, dating violence, and stalking.

With the exception of some medical and mental health providers, all university employees (including full and part-time faculty, staff, paid graduate assistants, student workers, etc.) are Mandatory Reporters and must report to the Title IX Office if the employee experiences,

observes, or becomes aware of an incident that meets the following conditions (see University Rule 08.01.01.M1):

- The incident is reasonably believed to be discrimination or harassment.
- The incident is alleged to have been committed by or against a person who, at the time of the incident, was (1) a student enrolled at the University or (2) an employee of the University.

Mandatory Reporters must file a report regardless of how the information comes to their attention – including but not limited to face-to-face conversations, a written class assignment or paper, class discussion, email, text, or social media post. Although Mandatory Reporters must file a report, in most instances, you will be able to control how the report is handled, including whether or not to pursue a formal investigation. The University's goal is to make sure you are aware of the range of options available to you and to ensure access to the resources you need.

Students wishing to discuss concerns in a confidential setting are encouraged to make an appointment with Counseling and Psychological Services (CAPS).

Students can learn more about filing a report, accessing supportive resources, and navigating the Title IX investigation and resolution process on the University's Title IX webpage.

Statement on Mental Health and Wellness.

Texas A&M University recognizes that mental health and wellness are critical factors that influence a student's academic success and overall wellbeing. Students are encouraged to engage in healthy self-care by utilizing the resources and services available from Counseling & Psychological Services (CAPS). 24- hour emergency help is also available through the National Suicide Prevention Hotline (800- 273-8255) or at https://suicidepreventionlifeline.org.

Course schedule

Date	In-class lecture topic	Ch		Date	In-class lecture topic	Ch
Week 1	**Introduction to Geomorphology**			**Week 9**	**No class, Spring Break**	
01/14 - T	Syllabus / Introduction to Geomorphology	1, B		03/11 - T	No class, Spring Break	
01/16 - R	Large-scale patterns and processes	2, 3		03/12 - W	No class, Spring Break	
Week 2	**Weathering**			03/13 - R	No class, Spring Break	
01/21 - T	Chemical weathering and soils	7		**Week 10**	**Coastal Landscapes**	
01/22 - W	Lab 1: Interpreting Landscapes			03/18 - T	Deltas	16
01/23 - R	Physical weathering and hillslopes	7, 10		03/19 - W	Lab 5: Hillslope Modeling	
Week 3	**Landscape Evolution**			03/20 - R	Waves and tides	16
01/28 - T	Mass conservation and landscape evolution	10		**Week 11**	**Coastal Landscapes**	
01/30 - R	Water in the landscape	11		03/25 - T	Coasts and Coastlines	
Week 4	**Sediment Transport**			03/27 - R	No Class	
02/04 - T	*Readings discussion: Topography*			**Week 12**	**Glacial Landscapes**	
02/05 - W	Lab 2: Python for Geomorphologists			04/01 - T	*Readings discussion: Coastal processes*	
02/06 - R	Open-channel flow	12		04/02 - W	Lab 6: Self-organization in Geomorphology	
Week 5	**Sediment Transport**			04/03 - R	*Midterm Exam 2*	8
02/11 - T	Sediment mobility	14		**Week 13**	**Glacial Landscapes**	
02/12 - W	Lab 3: Cosmogenic Nuclides			04/08 - T	Glaciers and Glacial Mechanics	8
02/13 - R	No Class			04/10 - R	Glacial Landforms	15
Week 6	**Sediment Transport**			**Week 14**	**Aeolian Landscapes**	
02/18 - T	Entrainment and transport	14		04/15 - T	Aeolian Landscapes	
02/20 - R	*Readings discussion: Sediment transport*			04/17 - R	No Class	
Week 7	**Fluvial Landscapes**			**Week 15**	**Other Landscapes**	
02/25 - T	*Midterm Exam 1*	11, 12		04/22 - T	*Readings discussion: Permafrost and dunes*	
02/26 - W	*Lab 4: Sediment Properties*			04/23 - W	Lab 7: Cat Field Erosion	
02/27 - R	River geometry	12		04/24 - R	Planetary Geomorphology	
Week 8	**Fluvial Landscapes**					
03/04 - T	Fluvial planform			04/29 - T	No class, Redefined Day	
03/06 - R	*Readings discussion: Bedrock channels*	16		05/01 - T	*Final Exam: 3:00--5:00 p.m.*	

Dr. Moodie reserves the right to modify the course schedule, including content, readings, and exam dates.

Discussion readings

Date	Topic	Selected Readings
02/04 - T	*Readings discussion: Topography*	Gilbert, G.K., 1909. The Convexity of Hilltops. The Journal of Geology.
		Tucker and Slingerland, 1994. Erosional dynamics, flexural isostasy, and long-lived escarpments: A numerical modeling study. JGR Solid Earth.
02/20 -	*Readings discussion: Sediment transport*	Wiberg and Smith, 1987. Calculations of the critical shear stress for motion of uniform and heterogeneous sediments. Water Resources Research.
		Folk, R.L., and Ward, W.C., 1957. Brazos River Bar: A study in the significance of grain size parameters. Journal of Sedimentary Research.
03/06 - T	*Readings discussion: Bedrock channels*	Sklar L., and Dietrich W.E., 2001. Sediment and rock strength controls on river incision into bedrock. Geology.
		Lamb, M.P., and Fonstad, M.A., 2010. Rapid formation of a modern bedrock canyon by a single flood event. Nature Geoscience.
04/01 - R	*Readings discussion: Coastal processes*	Ashton, Murray, and Arnoult, 2001. Formation of coastline features by large-scale instabilities induced by high-angle waves. Nature.
		Chatanantavet, P., and Lamb, M.P., 2014. Sediment transport and topographic evolution of a coupled river and river plume system: an experimental and numerical study. Journal of Geophysical Research: Earth Surface.
04/22 - R	*Readings discussion: Permafrost and dunes*	Jerolmack, D.J., Ewing, R. C., Falcini, F., Martin, R. L., Masteller, C., Phillips, C., Reitz, M. D., Buynevich, I. (2012) Internal boundary layer model for the evolution of desert dune fields, Nature Geoscience.
		Rowland et al. (2023) Scale-Dependent Influence of Permafrost on Riverbank Erosion Rates. Journal of Geophysical Research: Earth Surface.