

SYLLABUS: GLY 4700 – GEOMORPHOLOGY
University of Florida, Department of Geological Sciences

Semester: Fall 2015

Credits: 3

Course Fee: none

Meeting Location:

Meeting Time: Online course

In-Class Offering Meeting Time: Tuesdays and Thursdays, Periods 3-4, 09:35 am-11:30 am

Prerequisites: Intro-level geology course plus 3 additional GLY credits

INSTRUCTORS

Lead Instructor: Dr. Peter N. Adams

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COURSE DESCRIPTION

This course focuses on the origin/evolution of landforms and the physical processes responsible for their creation and modification. Each topic will relate to the following recurring themes that we use as guiding principles for the course: laws of conservation, transport rules, and event magnitude/frequency. The course is structured to begin with the “big picture” view of geomorphology (whole-earth shape and the large-scale details of the continents and ocean basins), then move on to the tectonic construction of landscapes, thermally-driven processes including glacial/periglacial systems, transport of material through fluvial and hillslope systems, sediment entrainment and deposition, and landscapes at the coastal/marine interface.

Course Objectives: It is the goal of this course that, by the end, students will:

- understand the relationship between numerous Earth’s surface landforms and the processes responsible for creating and shaping them.
- develop “back of the envelope” calculation skills to estimate geomorphic rates, landform size / shape, and timing, by employing the laws of conservation (mass, momentum, etc.).
- gain an appreciation for the frequency-magnitude distributions of geomorphic events throughout Earth history and how those distributions influence the landscape we see.
- be able to predict where on Earth particular geomorphic processes should be operating.

COURSE STRUCTURE

General Comments

To succeed in this class, students should do three things:

- 1) perform the assigned **readings** prior to **lecture**,
- 2) take your own notes on the **lectures**, which are a highlight of the content provided in the textbook and assigned **readings**,

- 3) work through the **assignments/problem sets** and **discussions**, soon after digesting the **readings** and the **lecture** material,

The **readings** will make students familiar with concepts ahead of time, making it much easier to understand concepts presented in lecture. I provide a list of reading assignments to go with the topic coverage list below. During **lectures**, I will emphasize key concepts and work through examples. Students will get extra practice integrating these concepts via **problem sets**. Through group **discussions**, students will exercise critical thinking and communication skills, by demonstrating an understanding of the material in depth. Note that the **readings** should not be considered a suitable substitute for the lecture material, and conversely the **lectures** are an incomplete advertisement for the **readings**, **problems sets**, and **discussions**.

Specifics of 'On-line' and 'Classroom' versions

This course will be offered both as an **on-line** and as a **classroom** version. The learning objectives and work load for the two versions are virtually identical.

For both versions, students will explore content provided (3-4 hours total) that will include readings and on-line lectures. The reading assignment schedule is provided at the end of this syllabus and on-line lectures will be made available every Saturday morning at 8:00am.

A homework assignment, usually in the form of 2-4 problems to be worked, will be made available at the beginning of the week as well - every Saturday morning at 8:00am. For the on-line version of the course, these problems will be worked through individually and will be due at 11:59pm on Friday of each week, unless it is a holiday. For the in-class version of the course, these problems will be worked on in-class on Tuesday (periods 3-4) and Thursday (period 3).

For some modules, students will participate in a group discussion on-line. For each discussion topic, students will be required to submit their post (typically of 1 paragraph, 3-4 sentences) by Friday at 11:59pm. After the initial posts have been submitted, students must submit a "follow-up" post, which provides comments on the initial post of another student. The objective of the discussion is to have students share and relate their personal experiences and how these relate to knowledge of the module topic.

There will be a weekly quiz to assess the students' understanding of the material. The on-line version of the quiz will be released on Wednesdays at 8am (except on homecoming week, when it will be released on Tuesday at 8am) and closed at 11:59pm on Friday (except on homecoming week, when it will be due on Thursday at 11:59pm). For the classroom version of the course, the quiz will be conducted in class Thursday period 4. The responsibility of knowing the due dates is up to the student – always check the due dates in the Canvas calendar since holidays may shift the due dates.

COURSE WEBSITE and COMMUNICATION

Course Website

The course will run via **Canvas** through the UF e-learning website; go to <http://lss.at.ufl.edu/> and click on the Canvas Login button. The course site will be used to post relevant

announcements, reading, lecture materials, links, assignments and quizzes, etc. You are responsible for checking this site for updates, announcements and to verify that your grades are recorded correctly. It is recommended that students adjust settings so that announcements are sent to phone or email. There is information on how to do this in the 'Start Here' section of the Canvas site.

Questions and Comments on course logistics (e.g. assignments, grading etc.) and on content (e.g. science or policy questions directed toward any of the course instructors) should be posted in the Course Questions Discussion Board within the course website. If you know the answer to a classmate's question, you are welcome and encouraged to answer it. Questions of a personal nature (e.g. medical emergency, legal, documented disability accommodation, etc.) should be sent to the instructor via e-mail who will address the issue appropriately.

COURSE MATERIALS

Required Textbook(s)

- 1) Anderson, R.S. & S.P. Anderson, 2010, *Mechanics and Chemistry of Landscapes*, Cambridge University Press.
- 2) Anderson, R.S., *The Little Book of Geomorphology* - available as a ~15MB download from: http://instaar.colorado.edu/~andersrs/The_little_book_010708_print.pdf

In addition, there will be selected readings posted or linked through the course website.

Optional Resources:

Below I list several textbooks that are good references for material covered in this course:

- 1) *Earth Surface Processes*, by Philip A. Allen, Blackwell Science
- 2) *Tectonic Geomorphology*, by Burbank and Anderson, Blackwell Science
- 3) *Mechanics in the Earth and Environmental Sciences*, by Middleton and Wilcock, Cambridge University Press
- 4) *Process Geomorphology (4th ed.)*, by Ritter Kochel and Miller, McGraw Hill
- 5) *Earth's Changing Surface*, by Selby, Clarendon Press
- 6) *Geomorphology (2nd ed.)*, by Bloom, Prentice Hall
- 7) *Surface Processes and Landforms (2nd ed.)*, by Easterbrook, Prentice Hall
- 8) *Tectonics and Topography*, reprints from JGR-Solid Earth, 1994
- 9) *World Geomorphology*, by Bridges, Cambridge University Press

ASSESSMENTS AND GRADING

Your grade for this class will be the result of your performance on the Assignments and Problem Sets (60%) – verified by turnitin.com Module quizzes (30%), and Discussion participation (10%).

Assignments and problem sets must be turned in on time. For the online offering of the course, turnitin.com will be used to verify that a student has completed the work themselves and has not plagiarized the solution. For some assignments, Google Earth will be used, so it's a good idea to gain familiarity with this useful (free) software. There are links to assist you with

learning Google Earth at the 'Start Here: Course Tools & Technology' page within the Course Canvas site. There will be no extra-credit assignments.

Final Grade Scale

A = ≥93%, A- = 90-92.99, B+ = 87-89.99, B = 83-86.99, B- = 80-82.99, C+ = 77-79.99, C = 73-76.99, C- = 70-72.99, D+ = 67-69.99, D = 63-66.99, D- = 60-62.99, E < 60

***Note:** An earned grade of 'C-' grade or below does not qualify for major, minor, Gen Ed, or college basic distribution credit.

For further information on UF's Grading Policy, consult:

<https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx>

COURSE AND UNIVERSITY POLICIES

Attendance and Absence

Students are expected to complete all requirements (assignments, problem sets, discussions, and quizzes) on the specified dates and will not be granted an alternate date unless they have an acceptable reason for their absence (e.g., absences due to medical emergency, observance of religious holidays, military obligation) or pre-arranged consent of the instructor. However, you may receive an extension on an assignment by pre-arranged consent of the instructor or in extraordinary circumstances. These requests must be timely and accompanied by all necessary written documentation.

'In-class activities' must be turned in by the end of each class period. They can be turned in only up to 1 week after the class they are due but will receive half credit. This does not apply to the online course, for which there will be no late work accepted.

Requirements for class attendance and make-up exams, assignments, and other work in this course are consistent with university policies that can be found in the online catalog at:

<https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx>

Classroom policy

Students may bring to each class meeting a laptop or similar device for use in taking notes, summarizing in-class activities, and accessing the internet. However, use of mobile devices and computers during class for purposes other than viewing readings or conducting sanctioned research is not allowed. Cell phones must be put on "vibrate" during class. Students who receive or make calls or text messages or engage in other disruptive behavior during class will be asked to leave and will not be allowed to turn in the assignment due on that day. Students should also bring pen/pencil and paper to each class.

Academic Honesty Policy

Students must conform to UF's academic honesty policy regarding plagiarism and other forms of cheating. This means that on all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: "On my honor, I have neither given nor received unauthorized aid in doing this assignment."

The university specifically prohibits cheating, plagiarism, misrepresentation, bribery, conspiracy, and fabrication. For more information about the definition of these terms and other

aspects of the Honesty Guidelines, see <http://www.dso.ufl.edu/sccr/process/student---conduct---honor---code/>. All students found to have cheated, plagiarized, or otherwise violated the Honor Code in any assignment for this course will be prosecuted to the full extent of the university honor policy, including judicial action and the sanctions listed in paragraph XI of the Student Conduct Code. For serious violations, you will fail this course.

Software Use

All faculty, staff, and students of the University are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against University policies and rules, disciplinary action will be taken as appropriate.

Accommodations for Students with Disabilities

Please do not hesitate to ask for accommodation for a documented disability. Students requesting classroom accommodation must first register with the Dean of Students Office (<http://www.dso.ufl.edu/drp/>). The Dean of Students Office will provide documentation to the student, who must then provide this documentation to the Instructor when requesting accommodation. Please ask the instructor if you would like any assistance in this process. Please provide this information to your instructor within the first two weeks of the semester.

Instructor Evaluation

Students are expected to provide feedback on the quality of instruction in this course by completing online evaluations at <https://evaluations.ufl.edu>. Evaluations are typically open during the last two or three weeks of the semester, but students will be given specific times when they are open. Summary results of these assessments are available to students at <https://evaluations.ufl.edu/results/>.

Drop/Add/Withdrawal

A student can drop/add during the drop add period with no penalty. After drop/add, a student who drops will receive a W until the date listed in the academic calendar. After that date, the student may be assigned an "E" (fail). Note: it is the responsibility of the STUDENT to withdraw from a course, not the instructor. Failure to participate/complete the class is NOT a drop.

Additional Resources

Students facing difficulties completing the course or who are in need of counseling or urgent help may contact the Counseling and Wellness Center:

<http://www.counseling.ufl.edu/cwc/Default.aspx>, 392-1575; or the University Police Department: 392-1111 or 9-1-1 for emergencies.

Other Resources available on-campus for students include:

- a. Student Mental Health, Student Health Care Center, 392-1171, personal counseling;
- b. Sexual Assault Recovery Services (SARS), Student Health Care Center, 392-1161, sexual counseling;
- c. Career Resource Center, Reitz Union, 392-1601, career development assistance and counseling.

COURSE SCHEDULE

Module 1: Whole Earth Shape - Introductory Concepts and Guiding Principles; Whole Earth Shape and Global Hypsometry, *Reading: Anderson and Anderson, Chp. 1: pp. 2-13 and Chp. 2: pp. 16-23*

Module 2: Ocean and Continent Shapes - Ocean Basin Shape: Heat Conduction; Ocean Basin Shape: Contraction and Isostasy; Tectonic Plate Motion: Origin and Speed, *Reading: Anderson and Anderson, Chp. 3: pp. 26-38*

Module 3: Tectonic Geomorphology I: Crustal Change and Faulting - Crustal Thickening, Erosion, and Mantle Response; Fault-Scale Tectonic Deformation; *Reading: Anderson and Anderson, Chp. 3: pp. 38-48 and Chp. 4: pp. 60-69*

Module 4: Tectonic Geomorphology II: Deformation and Flexure - Paleoseismology; Geomorphic Evidence of Long-term Deformation; Flexure of the Lithosphere, *Reading: Anderson and Anderson, Chp. 4: pp. 69-92*

Module 5: Earth's Atmosphere - Sun, Radiation, Weather, and Climate; Atmospheric Structure and Circulation, *Reading: Anderson and Anderson, Chp. 5: pp. 96-117*

Module 6: Tools of Geomorphology - Measuring Landforms; Absolute Dating Methods; Geothermometry and Exhumation, *Reading: Anderson and Anderson, Chp. 6: pp. 120-146*

Module 7: Weathering Rock to Mobile Sediment - Weathering, the Critical Zone, and Denudation; Mechanical Weathering Processes; Chemical Weathering Processes; Global Carbon Cycle and Regolith Production, *Reading: Anderson and Anderson, Chp. 7: pp. 161-211*

Module 8: Glacial Processes Landforms - Glacial Basics and Mass Balance; Ice Motion: Deformation, Sliding, and Surging; Glacial Erosional Processes and Landforms; Depositional Glacial Landforms, *Reading: Anderson and Anderson, Chp. 8: pp. 212-265*

Module 9: Hillslopes - Hillslope Diffusion; Specific Diffusive Hillslope Processes; Saturated Granular Materials and Landslides; Debris Flows, *Reading: Anderson and Anderson, Chp. 10: pp. 304-335*

Module 10: Geomorphic Hydrology - Subsurface Water in the Landscape; Runoff and Drainage Density, *Reading: Anderson and Anderson, Chp. 11: pp. 348-376*

Module 11: Rivers I: Flows, Geometry, and Patterns - Open Channel Flow in Rivers; Hydraulic Geometry and Flooding; River Channel Plan Views; River Longitudinal Profiles, *Reading: Anderson and Anderson, Chp. 12: pp. 380-414*

Module 12: Rivers II: Bedrock River Incision - Measuring Bedrock River Incision; Bedrock River Erosional Processes; Bedrock River Profiles and Widths, *Reading: Anderson and Anderson, Chp. 13: pp. 422-449*

Module 13: Rivers III: Sediment Transport - Grain Entrainment Mechanics; Sediment Transport Modes and "Laws"; Suspended Sediment Transport, *Reading: Anderson and Anderson, Chp. 14: pp. 452-473*

Module 14: Coastal Processes and Landforms - Tides, Waves, Currents; Sandy, Rocky, and Icy Coasts, *Reading: Anderson and Anderson, Chp. 16: pp. 502-528*