

Geomorphology: Syllabus, Winter Term 2020 (DRAFT)

Instructor: Stephan Gruber

Office: Room B443A Loeb Building

Hours: Friday 11:00–12:00 (please knock if door is closed)

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Prerequisites: GEOG 2104 (The Earth's Surface) and third-year standing, or permission of the department.**Lectures:** Friday 12:35–14:25 in Unicentre 376**Lab exercises:** Friday 11:35–13:25 in Loeb A237**First class:** January 10, 2020**Last class:** April 3, 2020**cuLearn:** This course is on cuLearn as **GEOG3102A WINTER 2020** (<http://carleton.ca/culearn>). For support, go to <http://carleton.ca/students>. Technical questions can be directed to Computing and Communication Services at 613-520-3700 or at ccs_service_desk@carleton.ca.

Course content and topics

How can we study geomorphology in ways that make sure we arrive at reliable conclusions? To provide answers to this guiding question, this course presents a survey of applied and theoretical concepts in geomorphology as well as their broader scientific basis or context. Labs will focus on building practical, quantitative skills in data collection, mapping, and modelling. These are relevant for applications such as land-use planning, watershed management, environmental impact and risk/hazard assessment. Conceptual and numerical models are explored and developed to synthesize and apply learning. Lectures are supported with relevant readings.

The main topics covered are: hillslope processes, geomorphic mapping, modelling, open channel flow, sediment transport, dating methods, sediment budgets, scale and emergence, glaciers and geomorphology, hazards and climate change.

Learning outcomes

The following learning outcomes summarize the overarching expectations of student's abilities at the end of this course. These expectations contribute to the larger-scale objectives defined at the program level for the Department of Geography and Environmental Studies.

To pass this course, you must demonstrate the ability to:

- (a) **apply** key concepts, theories, and methods in geomorphology to a given problem;
- (b) **discuss** the limitations of your work or that of others;
- (c) **adapt, create, apply** and **evaluate** computer-aided tools to solve simple problems;
- (d) **communicate** in a concise, accurate, traceable, and effective manner;

- (e) **discuss** transversal concepts such as “scale” or “emergence” in a context broader than geomorphology; and finally
- (f) **self-reliantly investigate and decide** what the breadth of knowledge is you require for answering a certain question, for mastering a topic, or for writing a lab report.

Schedule

Date	Time	Theme	Type	Room	Lab assignment
Jan 10, 2020	12:35–14:25	Introduction	lecture	UC 376	
Jan 10, 2020	14:35–16:25	Computer starter	lab	LA 237	Lab_01: Basic Excel and R
Jan 17, 2020	12:35–14:25	Two Geomorphologies	lecture	UC 376	
Jan 17, 2020	14:35–16:25	Two Geomorphologies	lab	A200LA	Lab_02: Where is Hellevelyn?
Jan 24, 2020	12:35–14:25	Hillslope processes	lecture	UC 376	
Jan 24, 2020	14:35–16:25	Hillslope processes	lab	A200LA	Lab_03: Slope evolution
Jan 31, 2020	12:35–14:25	Geomorphic mapping	lecture	UC 376	
Jan 31, 2020	14:35–16:25	Geomorphic mapping	lab	A200LA	Lab_04: Terrain mapping
Feb 07, 2020	12:35–14:25	Modelling	lecture	UC 376	
Feb 07, 2020	14:35–16:25	Modelling	lab	A200LA	Lab_05: Slope stability modeling
Feb 14, 2020	12:35–14:25	Open Channel Flow	lecture	UC 376	
Feb 14, 2020	14:35–16:25	Midterm exam	lab	A200LA	Midterm exam
Feb 21, 2020		Winter break			Winter break
Feb 21, 2020		Winter break			Winter break
Feb 28, 2020	12:35–14:25	Sediment transport	lecture	UC 376	
Feb 28, 2020	14:35–16:25	Sediment transport	lab	A200LA	Lab_06: GIS-based runout model
Mar 06, 2020	12:35–14:25	Dating methods	lecture	UC 376	
Mar 06, 2020	14:35–16:25	Dating methods	lab	A200LA	Lab_07: Dating methods
Mar 13, 2020	12:35–14:25	Sediment budgets	lecture	UC 376	
Mar 13, 2020	14:35–16:25	Sediment budgets	lab	A200LA	Lab_08: Sediment budgets
Mar 20, 2020	12:35–14:25	Scale and emergence	lecture	UC 376	
Mar 20, 2020	14:35–16:25	Scale and emergence	lab	A200LA	Lab_09: Essay preparation (Scale)
Mar 27, 2020	12:35–14:25	Glaciers and geomorphology	lecture	UC 376	
Mar 27, 2020	14:35–16:25	Glaciers and geomorphology	lab	A200LA	Lab_10: Paraglacial systems
Apr 03, 2020	12:35–14:25	Hazards and climate change	lecture	UC 376	
Apr 03, 2020	14:35–16:25	Hazards and climate change	lab	A200LA	Lab_11: Scale and quality of DEMs
April 15–25	TBA	Final exam		TBA	Final exam

Preparing for this course

Scripting in R and using ArcGIS: In lab exercises and assignments, you will need to use R for making short scripts and ArcGIS for manipulating and displaying spatial data. If you are unfamiliar with these tools, you will benefit from preparation before: (a) find fellow students or friends willing to mentor you, and (b) start using R on your computer (get it at <http://www.r-project.org>). Make sure you know what a data frame is, how to change values in it, how to add rows or columns, how to extract values from only one row or column. Practice making plots and write simple scripts in R. Use help in R and Google to answer questions.

Materials

Online resources: This course has a strong online component on cuLearn. Usually, slides will be available 30 minutes before the lecture as PDF. Before that, PDF files from the last year will often be available.

Reading: We will use a mixture of various book chapters and articles. Reading is usually assigned in the lecture where a short motivation is given. From that moment on you can find on cuLearn: (a) a link to the material to read, (b) a rationale why we read it, and (c) a number of concrete reading tasks. There will be a short quiz (called Just-in-time teaching response) to complete on these reading tasks.

Develop a strategy for organising your reading, your notes, and your learning. This can be paper based or by using a tool such as Mendeley (www.mendeley.com). If you need help, contact the Student Academic Success Centre <http://carleton.ca/sasc/>.

We will not use a specific textbook, but it may help you to sometimes consult the book you used in GEOG 2104 (The Earth's Surface): **Trenhaile, A.S. 2013.** *Geomorphology: A Canadian Perspective. Fifth Edition.* Oxford University Press: Don Mills. 575 pp. (or any other edition).

Topic organisation, graded submissions, and learning strategies

Topics: Every week has a new topic (lecture and lab) and reading is assigned the week before.

Just-In-Time-Teaching-Responses (JITTR): For the reading assignment you have to fill out a quiz in cuLearn. These are short and help you to revisit and solidify your learning. They also help me to tailor the lecture to address important open questions.

Lab Assignments: The lecture on a topic is followed by a lab for exploring practical aspects. Usually, there is an assignment to submit for grading. The assignment finishes a topic. With the lab submission you are asked to fill out a topic learning response (TLR) consisting of the same three short questions every time: (1) What is the most significant thing you have learned? (2) What is the most important issue that remained unclear? (3) What did you find most fascinating? This helps you to solidify your learning by reflecting on a completed topic, and it helps me to detect remaining open issues to revisit later.

Deadlines: All submissions are **due at 23:00 on Wednesdays** and deadlines will be visible in cuLearn with each assignment to complete. By that deadline, the lab and TLR for the previous topic as well as the JITTR for the reading assignment of the next topic are due.

This course has a constant amount of work and a number of things to submit each week. It is, however, not as bad as it seems (based on feedback from students). The JITTRs and TLRs will help you in preparing for the assignments and exams. As a consequence, completing them diligently and early gives you points several times for the same learning. Similarly, preparing for the midterm and the training essay lab will also train your ability to do well in the final exam.

Evaluation of students

Final grade: The final grade is determined by weighting:

Final exam	25%	
Midterm exam	15%	
Lab assignments	40%	(based on nine best results of eleven)
Topic learning response	10%	(based on nine best results of eleven)
Just-in-time teaching response	<u>10%</u>	(based on nine best results of eleven)
Total	100%	

All work is graded on a scale of 0–100 points. Lab assignments, topic learning responses, and just-in-time teaching responses are averaged for the entire course **taking only the best nine of eleven** possible results in each category. This means, you can miss two weeks and still obtain full marks. In practice, however, you should rather do all exercises and use the mechanism of dropping the worst in each category to improve your grade. Many assignments have grading rubrics that allow you to see how you will be graded.

The course instructor – subject to the approval of the Faculty Dean – determines standing. This means that grades submitted by the instructor may be subject to revision. No grades are final until they have been approved by the Dean.

Final exam: The final exam will take place in the period April 13–25, 2020; the precise date will be announced during the term. It will consist of three short-essay questions, and have a maximum duration of three hours. A list of eight to ten questions will be made available by March 20 to allow students to prepare. **Two of the final exam questions will be chosen from that list unmodified or with minor modifications only. One question will be new and you will see it for the first time during the exam.** Students are allowed to use a one-page (letter size, one sided) cheat sheet that they can prepare individually or as a group effort. **Missing the final exam:** You must contact the Registrar's Office within 5 working days.

Midterm exam: The midterm exam will consist of two short-essay questions. Students are allowed to use a one-page (letter size, one sided) cheat sheet that they can prepare individually or as a group effort. A list of sample essay questions will be made available by February 2 from which the exam questions will be drawn in identical or slightly modified form. **Missing the midterm exam:** If you miss the midterm exam due to serious illness or a death in the family, you must obtain documentation. Any other reason for missing an exam or lack of proper documentation will warrant a mark of 0 on that exam. To organise a deferred exam, contact Stephan Gruber within 48 hours of the exam and indicate whether you are a student registered with the PMC. It is University policy to not accept sick notes from Appletree walk-in clinics.

Lab assignments: For each topic/week, except for 'Open-channel flow', there will be one assignment. You are free to collaborate with others during the lab sessions to obtain common data, but please submit your own, individually written lab reports that contain your own analyses, own code, and own answers to questions. Discussions (in the lab sessions, on cuLearn or otherwise) are for gaining guidance and clarity on a topic. Students sharing/posting answers would be in breach of the Academic Integrity Policy (see below). Lab assignments must be typed and are collected through cuLearn as PDF documents. **Make sure your submissions contain your name, the date, the course, and the title of the assignment.** Each assignment has a rubric for grading that you can view on cuLearn to get an idea of what is required.

Topic learning response (TLR): Each of the three answers obtains 100/3 points if provided well. Answers that show no effort for reflection of learning (e.g., one-liners or collections of keywords) will not be counted.

Just-in-time teaching response (JITTR): No answer to a question receives 0 points and a very good answer receives 100 points. Results for several questions are averaged. Answers that show no effort for reflection of reading will not be counted.

Missing assignments or responses: There will be eleven weeks for which there are topic learning responses, just-in-time-teaching responses, and lab assignments. Only the best nine for each of these will be considered towards the final grade. If you miss **more than two lab assignments or more than two weeks of learning responses** due to serious illness or a death in the family, you must obtain documentation and contact Stephan Gruber. Please indicate

whether you are a student registered with the PMC. If you miss only one or two assignments and weeks of learning responses to whatever reason, this can be compensated by the remaining nine submissions in each category. If you missed them for other reasons, that is your choice. This rule keeps paperwork to a minimum so we can better focus on learning.

Penalty for late submission: Lab assignments have to be submitted before the due date/time indicated. Late submission will result in a reduction of your score by 20 points per started 24 hours of delay. The topic learning response and just-in-time teaching response have a sharp deadline and late submission is impossible.

Technical problems: It is your responsibility to submit assignments on time. For instance, if your Internet connection may be unstable, make sure that you have either an alternative plan or enough reserve time. If you cannot submit your material because of a technical problem caused by the instructor or Carleton University, please make a printout of the screen documenting that problem and note the date/time to avoid a late penalty.

Feedback: Both TLR and JITTR are intended to provide feedback to the instructor in an efficient way. Answers that show a sufficient reflection of the lecture or reading content will receive full marks. The instructor cannot provide detailed written feedback on every response. Important misunderstandings will be picked up in class or commented in cuLearn, but please be aware that writing something in the TLR or JITTR and not having it corrected DOES NOT imply that it would be entirely correct exactly as you wrote it.

Appealing your grade: There may be a number of circumstances in which students will have questions regarding their grades. These questions may be about understanding the grading scheme; about the grade awarded for a specific piece of work, including work that has not been returned; or, about the determination of the final grade. Wherever possible, both during the term and after, concerns about the grading of student work should be settled informally between the student and the instructor. When appealing your grade, please familiarize yourself with sections 2.7 and 2.8 of <http://calendar.carleton.ca/undergrad/regulations/>, from where also the paragraph above was taken, before beginning and appeal process. To make sure your case can be considered fairly, both for you and your fellow students, please provide the instructor with a short (one page maximum) summary of what point(s) you would like to have revisited and why you believe you deserve more points than you have received. Based on this, a personal meeting will be scheduled aimed at finding a resolution in agreement.

Evaluation of instructor and course

This course will be **officially evaluated** with a paper-based form near the end of the term. This is important for the instructor to improve the course, and it provides a feedback to Carleton University for helping to assess the quality of teaching delivered.

General feedback: If you have any pressing issue requiring an improvement in the course, especially with respect to accessibility, please contact me any time. If you notice spelling mistakes or things that can be improved in any of the materials we use, please let me know so I can fix it and make the course better for next year.

Academic regulations

The following section reviews the most important academic regulations at Carleton University. Please refer to the official version of the [Academic Regulations of the University](http://calendar.carleton.ca/undergrad/regulations/) at <http://calendar.carleton.ca/undergrad/regulations/> if you require further information. The official document takes precedence over this syllabus.

Copyright

Student or professor materials created for this course (including presentations and posted notes, labs, case studies, assignments and exams) remain the intellectual property of the author(s). They are intended for personal use and may not be reproduced or redistributed (hard-copy or electronically/online) without prior written consent of the author(s).

Instructional Offences

The University Senate defines plagiarism as “*presenting, whether intentional or not, the ideas, expression of ideas or work of others as one’s own.*” This can include:

- reproducing or paraphrasing portions of someone else’s published or unpublished material, regardless of the source, and presenting these as one’s own without proper citation or reference to the original source;
- submitting a take-home examination, essay, laboratory report or other assignment written, in whole or in part, by someone else (**this includes computer code**);
- using ideas or direct, verbatim quotations, or paraphrased material, concepts, or ideas without appropriate acknowledgment in any academic assignment;
- using another’s data or research findings;
- failing to acknowledge sources through the use of proper citations when using another’s works and/or failing to use quotation marks;
- handing in “*substantially the same piece of work for academic credit more than once without prior written permission of the course instructor in which the submission occurs.*”

Plagiarism is a serious offence, which cannot be resolved directly with the course’s instructor. The Associate Deans of the Faculty conduct a rigorous investigation, including an interview with the student, when an instructor suspects a piece of work has been plagiarized. Penalties are not trivial. They range from a mark of zero for the plagiarized work to a final grade of “F” for the course, and even suspension from all studies or expulsion from the University. For more information, see the web page on [Academic Integrity](http://carleton.ca/studentaffairs/academic-integrity/) at <http://carleton.ca/studentaffairs/academic-integrity/>.

Academic Accommodations

You may need special arrangements to meet your academic obligations during the term. For an accommodation request the processes are as follows:

Pregnancy obligation: write to me with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. For more details see the [Student Guide](#).

Religious obligation: write to me with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. For more details see the [Student Guide](#).

Academic Accommodations for Students with Disabilities: The Paul Menton Centre for Students with Disabilities (PMC) provides services to students with Learning Disabilities (LD), psychiatric/mental health disabilities, Attention Deficit Hyperactivity Disorder (ADHD), Autism Spectrum Disorders (ASD), chronic medical conditions, and impairments in mobility, hearing, and vision. If you have a disability requiring academic accommodations in this course, please contact PMC at 613-520-6608 or pmc@carleton.ca for a formal evaluation. If you are already registered with the PMC, contact your PMC coordinator to send me your Letter of Accommodation at the beginning of the term, and no later than two weeks before the first in-class scheduled test or exam requiring accommodation (if applicable). After requesting accommodation from PMC, meet with me to ensure accommodation arrangements are made. Please consult the PMC website for the deadline to request accommodations for the formally-scheduled exam (if applicable).